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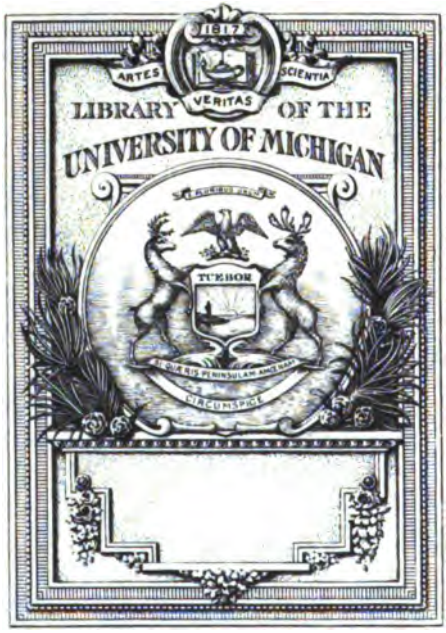

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Who Built the Panama Canal?

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Colonel Theodore Roosevelt

President of the United States during the Building of the Canal

Who Built the Panama Canal?

By

W. Leon Pepperman

Chief of Office of Administration of the Second Isthmian Commission

New York
E. P. Dutton & Company
681 Fifth Avenue

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E. P. DUTTON & COMPANY

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TO ALL THE MEN WHO DID THE WORK AND HELPED, IN WHATEVER CAPACITY, TO BRING ABOUT THAT TRIUMPH OF AMERICAN ENTERPRISE AND AMERICAN ABILITY

THE PANAMA CANAL

THIS BOOK IS DEDICATED BY

THE AUTHOR

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CONCERNING MR. PENNELL'S DRAWINGS

I feel that I cannot let this work go to press without a word of gratitude to Mr. Joseph Pennell for the use of his wonderful series of Canal pictures as illustrations for the volume.

These drawings are as beautiful as they are historically important, and in expressing my thanks to Mr. Pennell for his kindly offer, of which I have taken full advantage —as the reader will see—I am glad to know both that this story of the building of the Panama Canal is thus illustrated as no other man could have illustrated it, and that the work has the approval of one who has had every opportunity of knowing the truth of matters as they were in the Canal Zone in the days of the Second Isthmian Commission.

W. LEON PEPPERMAN.

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EXPLAINING THE AUTHOR'S CONNECTION WITH THE PANAMA CANAL

Extract from the Annual Report of the Isthmian Canal Commission for 1905, Page 148.

On April 3, 1905, the Isthmian Canal Commission, in full session, adopted the following resolution:

RESOLVED (2) That for greater effectiveness in the administrative work of the Commission there is hereby established at Washington an "office of administration" for the conduct of such operations as the Commission may, from time to time, determine to there conduct, and which shall include:

Records concerning all purchases and delivery of material and supplies (including commissary stores).

Fiscal affairs.

General books of account, containing details of all transactions of the Commission in the United States and adequate summary of all other accounts on the Isthmus, duplicate accounts in summary being regularly transmitted from the Isthmus to the Washington office; vouchers and contracts to be taken in sufficient number in

original to at all times furnish to the office at Washington a complete and original set thereof.

General auditing and accounting.

Correspondence of the Commission in the United States.

Orders and directions from the President and the Secretary of War.

Engineering reports and plans.

Reports from officials and committees of the Commission.

Reports of the Commission and its officers and committees to the Secretary of War, the President, and Congress.

Colonel Clarence R. Edwards, United States Army, was appointed Chief, and W. Leon Pepperman, Assistant Chief, of the Office of Administration. Colonel Edwards left Washington shortly after the office was opened to accompany Mr. Taft, the Secretary of War, to the Philippines, and Mr. Pepperman took charge. Colonel Edwards resigned from the service of the Isthmian Commission on his return to the United States, and Mr. Pepperman succeeded him as Chief of the Office of Administration, holding the position until the close of the railroad men's régime at Panama.

Who Built the Panama Canal?

FOREWORD

As preparations are going rapidly forward for a world-wide celebration of the opening of the Panama Canal, at the exact time determined nearly ten years ago under the Second Isthmian Commission, whose administration constituted what has come to be known as the "railroad régime" at Panama, in fancy I see many scores of men scattered over the forty-eight States and other scores still in the Canal Zone, who helped to make the work of that régime notable in the history of human achievement, scanning with perplexity the books that have been written about the new waterway and the articles concerning it in the public prints. "Is it a fact or is it a dream," in imagination I hear them say, "that it was the railroad men of the United States who created a modern state in that ten

by fifty mile stretch of tropical wilderness across Panama, scourged by fevers and pestilence and practically uninhabitable by natives of other climes when we arrived? Is it true that we made possible and planned and began the construction of the mammoth duct that joins the Atlantic and Pacific oceans, over which feat the ends of the earth now unite in admiring clamor? Did we or did we not face death to bring order out of chaos that the men who carried out our plans might perform their labor unhindered by malign circumstance and unafraid of disease? Is it our delusion that we were the men who designed, purchased, and installed the machinery with which the wonderful ditch was dug, and started the digging; that we determined the character of the labor employed, recruited that labor, brought it to the Isthmus, built houses for it, and made the arrangements by which it was fed; that we reconstructed the railroad that was essential to the cutting of the famous channel?

"If, indeed, it was the railroad men who did these things, why is it that our arduous and successful labors are so soon forgotten?"

Who built the Panama Canal? That is, to

whom is the world most indebted for the realization of the dream of four centuries, that reduces the dimensions of the earth?

At the very outset I wish to accord full credit to Colonel George W. Goethals and his associates of the army and navy who have carried to a successful fruition the construction of the Panama Canal. The masterly manner in which he with their assistance completed the construction of the Canal after the plans had been formulated and the work begun by the railroad men, gives him world-wide eminence to-day. What qualities this great task called for, and the determination and capacity with which it was accomplished, are admirably set forth in the concluding words of Joseph H. Choate's speech at Carnegie Hall, presenting to the Colonel the medal of the Civic Forum. "For the patience and fortitude which carried you safely through it all," said Mr. Choate, "for the wisdom and skill that made the completion of the Canal possible, for the commanding personality which maintained discipline and order among the tens of thousands engaged in the work, without strikes, confusion, or delay; for the purity and integrity of char-

acter which you have imparted to the work itself, and for your never-failing hope and courage and constant patriotism, the Civic Forum has designed this medal, of which they beg your acceptance, as a slight token of the appreciation and gratitude of your fellow-citizens of all parties and of every creed."

But, while according full credit to Colonel Goethals and the army administration for what they have so ably accomplished, I feel it my duty to call attention to the fact—which might easily be overlooked in the national exultation over the actual opening of the Canal—that the structure so ably carried to completion was built upon a foundation laid by the railroad administration. Colonel Goethals himself is quoted by William Joseph Showalter, in the *National Geographical Magazine*, as saying:

"The people talk about the success of the army engineer at Panama, but it was fortunate that Mr. Stevens preceded us. The real problem of digging the canal has been the disposal of the spoil and no army engineer in America could have laid out the transportation scheme as Mr. Stevens did. We are building on the founda-

tions he laid, and the world cannot give him too much credit."

It is doubtful if one American in a thousand is aware, moreover, that President Roosevelt in 1905 put the greatest national enterprise ever attempted by the United States into the hands of Theodore P. Shonts, now president of the Interborough Metropolitan Company of New York, who, as head of the Second Isthmian Commission, brought together and directed the splendid body of railroad men whose services made the Canal a certainty; indeed, so far as anything that has appeared in recent American publications is concerned (save for a brief outline of the work accomplished in 1905 and 1906, written by Mr. Shonts himself, that was published in the *North American Review* last February), there might never have been a railroad régime at Panama.

It is an astonishing fact that in the seven most recent books published upon the Panama Canal the authors practically ignore the services rendered to the nation in its construction by the chairman of the Second Isthmian Commission

—a circumstance which has been overlooked by Theodore Roosevelt himself, when dealing in his autobiography with the "Monroe Doctrine and the Canal." In the case of many of these writers the oversight is no doubt unintentional. Yet men in a position to know go so far as to say that had Mr. Shonts not possessed that rare faculty of being able to inspire others with his own enthusiasm that we call personal magnetism, as well as untiring energy and a positive genius for executive detail, the Panama Canal might still remain the mere potentiality that it had been for four centuries previous to the advent of Theodore Roosevelt. Colonel Gorgas, whose brilliant campaign against disease at Panama has brought him international fame, holds this view. "I believe that had not a man of Mr. Shonts' executive ability, foresight, force of character, and magnetism, who thought and acted in millions where we army and navy officers did in thousands, come to Panama at the time he did, the Canal would never have been built," said Colonel Gorgas during a recent visit to New York. "I would never have dared even to make application for the immense amounts

of money he authorized me to spend for the sanitation of the Canal Zone, and I might not have been able to do the work afterward without the warm support he gave me."

It was during the administration of Mr. Shonts that the most important problem in connection with the whole Canal work was definitely settled, that is, the adoption of the lock-level type of canal, as opposed to the so called sea-level type, recommended by a majority of the Board of Consulting Engineers. The activity and resources displayed by Mr. Shonts in marshalling and organizing the campaign for the lock-level canal have been fully recognized by all those who were associated with him during this period of his service.

Mr. Shonts took charge of Panama in the midst of a yellow-fever epidemic, with the few skilled white workers deserting by hundreds. There were only 8000 colored men in the Canal Zone to perform the unskilled labor; the plans for the Canal had not yet been made, and it had not even been settled whether it was to be of the sea-level or the lock type; the railroad which was an indispensable instrument to the removal

of the spoil[1] from the excavation was practically useless; the only digging equipment on the Isthmus was the out-of date machinery left by the French. When Colonel Goethals began his extraordinarily successful labors two years afterward, the Canal Zone was as healthful a place to live and work in as most parts of the United States; the plans for the Canal had been worked out and its construction was under way, with the machinery essential to its digging in operation, and the maximum of dry excavation almost reached; there were 10,000 white and 25,000 colored men on the Government's pay-roll, and the railroad was in as good running order and as well equipped as any in America or Europe. It is doubtful if so gigantic a task as that performed by the railroad men on the Isthmus of Panama was ever before accomplished in so short a time. So well qualified an observer as the historian Charles Francis Adams, in an article read before the Massachusetts Historical Society in 1912, declared that the work of preparation for the actual digging of the waterway

[1] *Spoil* is the engineering term for earth and débris removed in excavating.

across the Isthmus of Panama would "at no remote day be recognized as an epochal development much more impressive than one of mere canal construction."

One of the railroad engineers on the Isthmus described the situation thus: "We built the machine and started it going, and then gave the handle to Goethals, who turned the crank and ground out the results."

Mr. Taft made a useful suggestion in the Ohio Society address. "The history of the Panama Canal and the difficulties connected with it ought sometime to be written by one who knows," he said.

As Chief of the Office of Administration of the Second Isthmian Commission, I know what was accomplished during 1905 and 1906 in the Canal Zone, and I propose to write something about the period, neglected of letters, during which that as yet unrecognized epochal development outlined by Mr. Adams was effected. I propose to show that it was the railroad men, under the direction of Theodore P. Shonts, who rendered the paramount service in the construction of the Panama Canal. I shall demonstrate

this proposition by facts and figures that are matters of governmental record. It is not only because I am anxious that justice should be done to the men who under my direct observation wrought the miracle in the Canal Zone; it is as well a duty I owe to the student of history.

Whether or not the Canal would have remained a conjectural project, had not Mr. Shonts concentrated his energies upon it in 1905 and 1906, I am able to bear witness to the fact that his advent galvanized into new life every American in the Canal Zone. Appointed chairman of the Second Commission in April, his first measure was the creation of an organization in Washington, the "Office of Administration," through which rapid communication might be had with the scene of action at Panama, after which he took personal charge on the Isthmus, where in a month he had transformed a little band of discouraged workers into the enthusiastic nucleus of a great industrial army, and apportioned to each department of the Canal construction its duties. Mr. Stevens, who accompanied Mr. Shonts to Panama as Chief Engineer, thus described the situation on

their arrival, in an address before the Oregon Society of Engineers:

"When I reached Panama in July, 1905, conditions could have been much worse, but they were bad enough. No real start had been made at any effective work on the Canal proper, no adequate organization had been effected, sanitary reforms were really just beginning, little new plant had been provided, and little that was absolutely necessary had been ordered. In the organization that existed no coöperation was apparent, and no systematic plans, as far as I could discover, had been formulated toward the carrying out of the work along the lines promising any degree of success. And—worse than all—over and above, in the diseased imagination of the disjointed force of white employés, hovered the angel of death in the shape of yellow fever, a number of cases of which were then prevailing, and from which several deaths had occurred. What many of the intelligent men seemed to expect was an order from Washington to abandon the work and go home. To provide housing for this army, to properly feed, to instil into them faith in the ultimate success of the work, to weed out the faint-hearted and incompetent, to create an organization fitted to undertake the

tremendous work, and to fill its ranks with the proper material, was a task of heroic proportions. No one will ever know, no one can realize, the call on mind and body which was made upon a few for weary months while all the necessary preliminary work was being planned and carried forward, and no attempt was or could be made to carry on actual construction until such preliminaries were well in hand. And the only gleams of light and encouragement were the weekly arrivals of newspapers from the States, criticizing and complaining because the dirt was not flying."

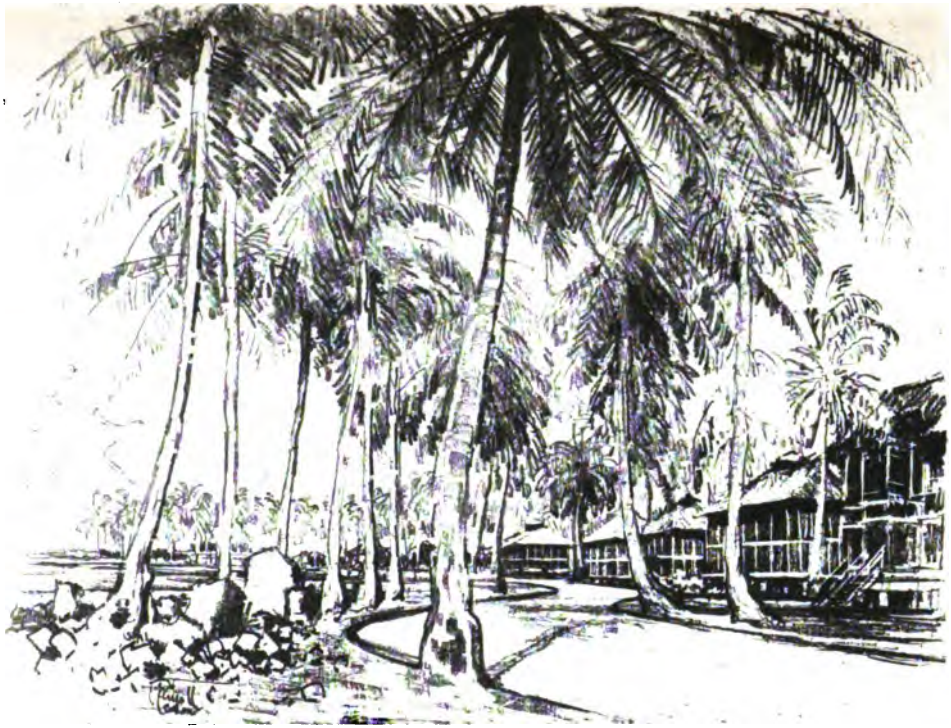
The Second Isthmian Commission reached the conclusion soon after the arrival of Mr. Shonts at Panama that it would be a criminal as well as an uneconomic policy to begin the actual excavation of the Canal while sanitary conditions were such that the laborer did his work at the peril of his life; and, in spite of the clamor of the American newspapers, adhered to the determination to render the Isthmus habitable before beginning to "make the dirt fly," rather than bring men there to die. In the meantime the only work done on the Canal itself was to put the various levels in the Culebra Cut into

proper condition for the installation of the steam shovels, and the laying of additional railroad tracks; the task of the moment was preparation. During the following eighteen months the Commission, with the sanction of Mr. Shonts, spent on the Isthmus of Panama $30,000,000, of which about $5,000,000 was for government and sanitation; $7,000,000 for construction of quarters and other buildings, docks, wharves, railway employment, waterworks, and sewers; $12,000,000 for permanent plant; $4,500,000 in materials and supplies, and more than $1,500,000 in sewers, waterworks, and paving in the cities of Panama and Colon.

In November, 1906, President Roosevelt personally inspected the work accomplished in the Canal Zone by the railroad men, and sent a special message to Congress on the result of his investigation. The message concluded thus:

"Of the success of the enterprise I am as well convinced as one can be of any enterprise that is human. It is a stupendous work upon which our fellow-countrymen are engaged down there on the Isthmus, and while we should hold them to a strict accountability for the way in which

they perform it, we should yet recognize with frank generosity the epic nature of the task on which they are engaged and its world-wide importance. They are doing something which will redound immeasurably to the credit of America, which will benefit all the world, and which will last for ages to come. Under Mr. Shonts and Mr. Stevens and Dr. Gorgas this work has started with every omen of good fortune. They and their worthy associates, from the highest to the lowest, are entitled to the same credit that we would give to the picked men of a victorious army; for this conquest of peace will, in its great and far-reaching effect, stand as among the very greatest conquests, whether of peace or of war, which have ever been won by any of the peoples of mankind. A badge is to be given to every American citizen who for a specified time has taken part in this work; for participating in it will hereafter be held to reflect honor upon the man participating just as it reflects honor upon a soldier to have belonged to a mighty army in a great war for righteousness. Our fellow-countrymen on the Isthmus are working for our interests and for the national renown in the same spirit and with the same efficiency that the men of the Army and Navy work in time of war. It behooves us in our turn to do all we can to hold up their hands and



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Colon

to aid them in every way to bring their great work to a triumphant conclusion."

It is perhaps worth remarking—in view of the circumstances that a misapprehension as to actual conditions seems to exist, even among officials who ought to know better—that Mr. Shonts had the same power in the Canal Zone during the railroad régime that was invested in Colonel Goethals afterward, and in Mr. Stevens during the brief period that he was in control. Indeed, Mr. Shonts made it an indispensable condition of acceptance, when President Roosevelt offered him the Chairmanship of the Second Isthmian Commission, that he should have absolute authority as to both men and measures in the construction of the Canal.

It was in January, 1907, that, having perfected the machine which was to build the Panama Canal and started it going, Mr. Shonts reminded the President of his promise, made in April, 1905, that when the excavation of the cut between the Oceans was under full headway, the Chairman of the Second Isthmian Commission should be allowed to resign from the Government service. His conduct of Canal affairs, on the

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Isthmus and in Washington, had enhanced his previous reputation for capacity made in the railroad world before he went to Panama, and the financiers who were planning the combination of the subway, surface, and elevated railway systems of New York into the gigantic organization that now exists as the Interborough Metropolitan Company, knowing of Mr. Shonts' compact with Mr. Roosevelt, had requested him to accept the presidency of the proposed corporation. The position was one involving an infinitely greater demand on his peculiar genius as an organizer and executive than the mere digging of the Canal now that the work was begun, and in January, 1907, Mr. Shonts gave the President to understand that he was inclined to unite his fortunes with the new enterprise, and sent in his resignation as Chairman of the Isthmian Commission. Mr. Roosevelt's response was as follows:

"The White House, Washington, Jan. 22, 1907.
"My dear Mr. Shonts:

"I accept your resignation as Chairman of the Isthmian Canal Commission, to take effect on March 4, with extreme reluctance. I do so

merely because I do not feel justified in preventing your acceptance of the position you have been asked to take in New York—a position of such great consequence not merely to the people with whom you will be associated in the business management of the enterprise, but to all the citizens of New York. You have shown throughout your association with the Isthmian Canal Commission such energy, administrative capacity, fertility of resource and judgment in handling men, together with such entire devotion to your work, that I hardly know whether most to regret the fact that the National Government is to lose you, or most to congratulate those who are to profit by your services in your new position.

"With all good wishes for your future, and with the heartiest thanks on behalf of the Government for what you have done in the last eighteen months, in the vitally responsible position you have held, believe me,

"Ever sincerely yours,

"THEODORE ROOSEVELT."

It was during the eighteen months following Mr. Shonts' first visit to Panama that the hitherto insurmountable obstacles in the way of the construction of the Canal were overcome

and the work begun. The same difficulties that beset the railroad men had confronted the First Isthmian Commission, with the late Rear-Admiral John G. Walker as Chairman, and Major-General George W. Davis, of the retired list of the Army, as Governor of the Canal Zone (constituting what was known as the Army and Navy régime), and it is not minimizing the result of its efforts to say that it did not accomplish as much toward the solution of the Canal problem during the fourteen months of its existence—from February, 1904, to April, 1905—as had been effected by the railroad men within a few weeks of their arrival on the Isthmus, and this in spite of the fact that John F. Wallace, the chief engineer under the earlier administration, was a railroad engineer of the first rank and that Colonel Gorgas was on the spot.

One reason, no doubt, for the success attained by the railroad administration in laying the foundation for the construction of the Panama Canal was that they approached it from the correct point of view, the point of view familiar to their training and experience. They looked upon the Panama Canal as primarily a con-

struction task, a work of excavation and transportation, and one requiring primarily the application of methods of practical administration. From this aspect of the case it was an undertaking of the highest order, but when properly examined, it will hardly be seen to be, at least from a technical view point, the greatest engineering achievement of history, as seems to be the universal belief, and in spite of the fact that we are thus informed by so accurate a scholar and man of affairs as James Bryce, the historian and former Ambassador from Great Britian to the United States. What Mr. Bryce probably meant was that the Canal is the greatest, in that it is the most significant, engineering achievement of history, because of the momentous world-potentialities, foreseen and unforeseen, to arise out of new conditions created by the short cut between the Atlantic and Pacific Oceans at Panama.

As an engineering achievement the construction of the Panama Canal was one of magnitude rather than complexity. Had it been carried out in a temperate clime the fact would have been clearly understood. That it

is the most expensive construction of its length ever completed is due to the fact that conditions approximating modern civilization had to be brought into existence in a tropical wilderness 2000 miles from the base of supplies for the work itself and the men performing it. Merely as a feat of engineering the construction of the Canal was perhaps less intricate and involved than many other less conspicuous works executed during the same period in the United States. Once given conditions approximating modern civilization in the Canal Zone—sanitation, homes, markets, and entertainments; the necessary supplies to keep the working forces contented and in good health; an organization for gathering and augmenting these forces—all that remained of the Canal construction problem was to "make the dirt fly," in the language of President Roosevelt. How free from complications was the problem may be gathered from the fact that as soon as the railroad men had determined the capacity of the plant they were assembling on the Isthmus, which was early in 1906, they fixed the time for the completion of the work.

The distance from deep water in the Atlantic

to deep water in the Pacific at Panama is fifty miles. There were no great property rights to be protected along this stretch of territory; there was no possibility of damage to private property or other interests; there was no outside traffic to take cognizance of, no thought of trains that must move on schedule time with the alternative of throwing the business of a community into disorder; there were no contracts, no specifications, no estimates to be lived up to, no supervisory control as in ordinary engineering operations. If a slide occurred it only signified the removal of more earth and rock, which in the end meant a few additional days' labor and the cost of moving the material. The added width of the cut at the slide did not affect the completed Canal, or the value of the adjacent land. The men at work on the drills, steam-shovels, cars, and locomotives, in the ships and storehouses, and on the tracks, lived and were provided for much nearer their work than, for instance, similar forces employed in the building of the subway in New York. Thirty minutes would be a liberal estimate of the time necessary for a Canal employé to go from his

living quarters to his daily labor. Few of the men employed on construction in our larger cities work under as favorable living conditions. The problem at Panama was merely to dig, and keep on digging.

It is interesting to compare in this connection the engineering difficulties on the Isthmus with those which have had to be met in some familiar undertakings in the United States. Take the construction of the subways in New York City for example. The subways occupy a width of from 50 to 52 feet between the walls on either side, and only a few feet removed are the foundations of towering buildings of masonry and steel, that have cost immense sums and must be protected. An engineering error or miscalculation in the work on the subways would mean damage to these buildings that might amount to millions of dollars, to say nothing of peril to human life. But a few feet above the laborers on the subway, street cars are moving, and above them are the elevated railroads, whose foundations must be carried below the subway level without interfering with trains running on a minute and a half headway. Conduits and wires

that involve protection from fire, the distribution of gas and electric light and power, the employment of the telephone and telegraph, the removal of sewage, must be handled by the subway engineers without curtailing the effectiveness of these instruments in the transaction of the business of a great city. Perhaps the most difficult and dangerous piece of engineering work ever attempted on the subway is one that is yet to be accomplished at Times Square, where the connection between the present underground system and the new Seventh Avenue line will be made. During every three-minute period for eighteen hours every day, in the ordinary course of travel, more than 5000 passengers will be within the zone of danger incident to this work, which includes the removal of the subway roof while trains are passing, and in spite of the fact that the steel structure and concrete arches over the cars leaves a clearance too small for the insertion of one's fingers between the car tops and the roof.

As an engineering achievement in the strict sense of the word (defined by Webster as "the art or science by which the mechanical properties

of matter are made useful to man in structures and machines"), the rebuilding of the Grand Central Station in New York is perhaps the most difficult ever executed. Within an area 3902 feet long with a maximum width of 945 feet, from one to three thousand men labored continuously for nine years working in rock to a depth of fifty feet, and removing 2,500,000 cubic yards of material and transporting it from 22 to 40 miles for disposal. Within this area 187,000 cubic yards of concrete have been mixed and laid, and a station with 12 tracks removed. In its place has been erected a marble palace that comprises a station with 58 tracks, capable of handling a daily traffic of 250,000 passengers, all of this having been erected without interrupting the operations of one of the busiest railway terminals in the world and without inconvenience to the traveling public. Statistics show that during the final year of the rebuilding of the Grand Central Station, 1911, there were 138,000 train movements on the site of the work, an average of one every three minutes and forty-seven seconds throughout the entire 12 months, which means 387 trains

per day, handling 40 passengers per minute every hour of the 24—more than 20,000,000 during the year.

The development of the largest water-power plant in the world, at Keokuk, Iowa, on the Mississippi River, required no doubt the application of a higher degree of technical engineering skill than the Panama Canal. Here the flow of the Father of Waters had to be dealt with, a concrete dam 4649 feet long and 50 feet high, containing 198,000 cubic feet of concrete and tied bed rock being built from bank to bank, the work being carried on summer and winter, during low water and at flood periods, and subject to ice packs and jams. This dam, with a lock 110 feet wide with a lift of 40 feet (the width being the same as the Panama Canal locks, while the greatest lock height at Panama is only 30 feet and 3 inches), and a dry dock 463 feet long and 150 feet wide, forms a navigable lake 65 miles long, effecting a possible saving of two hours in navigating this reach of the river. This work was done by private enterprise to harness the Mississippi River for power conservation, and the plant becomes the property of the

United States without having cost the Government one dollar.

Other illustrations of this thought will no doubt readily occur to the learned civil engineer. The real problem at Panama was that of making the country habitable, assembling a plant, and a force to work it, and providing an adequate system for their effective working. That problem solved, nothing remained but straight-ahead work and capable management of affairs—a task requiring a high order of administrative ability, which fortunately has never since been lacking.

Amongst the possible future improvements to the Canal will be the building or rather digging of the "Tiger Hill cut off"—as it is known amongst the engineers. This is a tangent or straight sailing line extending from the head of the Gatun Locks to the Culebra Cut. It would shorten the distance by 3½ miles over the present route by a substitution of a single straight route 16 miles long for one composed of 5 short courses, having a total length of 19½ miles.

It would not only reduce the time of passage

by shortening the distance but would add to the safety of navigating a vessel through the Canal.

Had the railroad engineer remained in charge, it would not require a bold man to predict that such a line would now be in operation, as the education of the railroader is to lessen distance and straighten out his route, and he would more than likely, as the plans of the Canal developed, have seen the advisability of this change that is so strikingly shown when the published maps of the route are studied as a whole.

Another possible change that it is believed time will remedy is the doing away with the Pedro Miguel Lock and duplicating the Gatun flight at Miraflores. When it was determined to move the locks back from La Boca to Miraflores, then the Pedro Miguel Locks should have been also moved. As a combined flight they would have cost less to build, maintain, and operate, having less masonry, and fewer lock gates. Such an arrangement would cause a ship to make one less stop and start in passing through the Canal. It would have done away with the little Miraflores Lake extending from the lower gate

of the Pedro Miguel Lock to the head gate of the Miraflores, which is only about one and one half miles in length, and in which a ship has to start, get under headway, and stop. In its place, had the Gatun flight been duplicated, there would have been a larger lake with about thirty feet more of depth—forming an extension of the Culebra Cut, which by its area would have materially lessened the current in the Culebra Cut while the lock chambers were filling.

When time shall give historic perspective to the present view of recent events in Panama, the potent and splendid part played by the French in the creation of the Canal will receive the recognition now—in the hysteria attendant upon the completion of the portentous waterway —denied all but the executive of the last relay of the work. Indeed Philippe Bunau-Varilla, the patriotic Frenchman who has devoted the best part of his life to the Canal project, has written a book whose "aim is to explain how that great conception of French genius, the junction of the Pacific and Atlantic Oceans, was snatched from her; and that the solution of the problem of the opening of a free strait

between the two oceans was her work and hers alone." Whether or not Bunau-Varilla is entitled to write Q. E. D. on the final page of *Panama: the Creation, Destruction, and Resurrection*, the fact remains that the work of the French at Panama was of enormous importance and assistance to the Americans who built the Canal, even if we do not consider it indispensable.

The three controlling factors in the final construction of the waterway across the Isthmus of Panama were the French, Theodore Roosevelt, and the railroad men.

It is primarily due to the French that there is a short cut between the Atlantic and Pacific Oceans at Panama, for had they not begun the work the United States has completed, we would be excavating our canal at Nicaragua—if we were excavating anywhere. Bunau-Varilla will see to it that the laurels of the French are not allowed to fade.

Had it not been for Theodore Roosevelt the United States would not have acquired the Canal Zone in 1903. He is quoted as saying: "I took Panama and left Congress to debate about

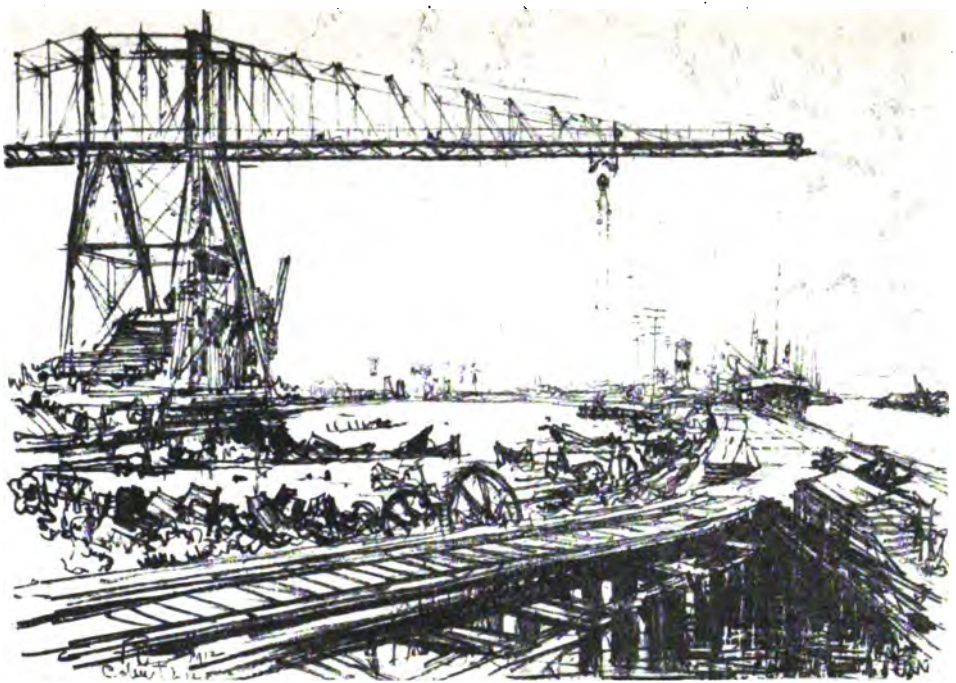
it afterwards." Had the debate come first Mr. Roosevelt might not have "taken" Panama at all. His part in the great enterprise is already a matter of history.

Had it not been for the railroad men (chosen, brought together, and directed by Theodore P. Shonts, who is deserving of credit for their success in the same manner that a general is deserving of credit for the victory of his army), the conditions under which the Canal was dug would never have been brought about on the Isthmus of Panama, for it would imply a bolder Congress than has yet met in Washington to finance a third attempt to subjugate the tropics had the railroad men proved unequal to their task after the failure of the Army and Navy régime, following that of the French. It is because no more competent historiographer has arisen for the railroad men that I venture into the breach.

W. Leon Pepperman.

New York, July 20, 1914.

Since writing this Foreword I have seen a letter written to a friend in New York by Congressman



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French Canal. American Cranes

Oscar W. Underwood, who has been either majority or minority leader in the House of Representatives since the Canal was started, in which he says:

"I concur in what you say in reference to the civilian engineers, for although Col. Goethals and his corps of engineers are entitled to the credit for the final construction of the work, there is no doubt about the fact that the plans and organization of the original civilian engineers constitute the base on which the Canal was built."

CHAPTER I

THE FRENCH AND THE FIRST COMMISSION

'For 400 years—ever since the early Spanish explorers, whose number included Christopher Columbus himself, gave up the search for the "hidden strait" across Central America the existence of which was a tradition among the native Indians—the project of uniting the Atlantic and Pacific Oceans by the construction of an Isthmian Canal has agitated the minds of men. The first plans for such a channel are said to have been made by a Spanish engineer named Saavedra, one of Balboa's followers, between 1517 and 1529; but, when, after his death, Charles V of Spain ordered surveys of the Isthmus, the scheme was reported to be impracticable—as, indeed, it would have been with the tools for excavation then in use. Philip II revived the idea in 1567, sending an engineer to survey a route across Nicaragua, but he

piously gave up the project when his spiritual advisers pointed out to him the probability that the Creator had an Isthmian Canal in mind when he issued the admonition: "What God hath joined together, let no man put asunder." Philip's God-fearing successors were held in check, possibly, by this same ecclesiastical revelation until 1814, when Spain decreed the construction of a canal between the Oceans with a view to reviving her prestige with her Central American colonies—only to have them achieve their independence before that purpose was attained.

Meanwhile, stone-paved highways across Panama, preceding the Panama Railroad that in turn preceded the Canal, for more than three centuries served the pack-trains carrying treasure that made Old Panama the richest city of her time in the world. Spain, England, Portugal, and France have each contemplated a waterway across Central America, and nineteen different routes have been discussed, of which Tehuantepec, Nicaragua, and Darien were the most important after Panama. In 1869 President Grant appointed an inter-oceanic canal commis-

sion, and the following year this country and the United States of Colombia entered into a treaty to build a canal provided a satisfactory route might be found. This commission, respecting the rights of the Panama Railroad (as set forth in another chapter), which had been opened to traffic in 1855, investigated such routes as the Caledonia, the San Blas, and the Atrato, and in 1876 reported favorably on the route across Nicaragua.

It was the French, however, who began the actual work of cutting a channel across Central America, and it was not until 1880 that the work began at Panama, with Ferdinand de Lesseps, famous as the builder of the Suez Canal, at the head of the construction company. It is due to the fact that the work was already begun at Panama that the United States adopted this route instead of the one across Nicaragua; for, when the French company failed, its property—which included the Panama Railroad and nearly 30,000,000 cubic yards of excavation available for our use in a cut twelve miles long—came upon the market.

The Universal Inter-oceanic Canal Company,

which began the construction of the Panama Canal, was organized by de Lesseps in Paris in 1879, after a body he had convened, known as the International Congress of Surveys for an Inter-oceanic Canal, had pronounced in favor of a sea-level canal from Limon Bay to Panama Bay, which was to be completed in twelve years at a cost of $240,000,000. In 1889 the company failed, after having spent more than $260,000,000 and having excavated—according to M. Bunau-Varilla—72,000,000 cubic yards of earth and rock. Five years later the New Panama Canal Company was formed in Paris, which, according to the same authority, excavated 8,000,000 cubic yards, and continued to do sufficient work to maintain its franchise until it was bought out by the United States in 1904.

Every American engineer—as well as every engineer of any other nationality—who has visited Panama since the United States began work on the Canal, has marveled at the splendid work done there by our predecessors before science conquered yellow fever and modern machinery made possible accomplishment unheard of only a few years before. Chief

Engineer Stevens, in his evidence before the International Consulting Board in 1905, said: "I cannot conceive how they (the French) did the work they did with the plant they had." A correspondent of the London *Standard*, who visited the Canal in 1910, referring to Colonel Sibert, one of Colonel Goethals' leading assistants throughout the military régime on the Isthmus, says: "He, and all other officials I met, emphasized, not in any spirit of generosity, but with sincere professional appreciation, the excellence of the work done by the French engineers. According to most of the American officers in charge of the great Canal departments, the foresight, skill, and ability displayed by the French under the Lesseps régime have never received the praise they deserve."

Nevertheless, the general impression seems to be that the French accomplished practically nothing on the Isthmus of Panama, and that the $40,000,000 we paid them was money thrown away. The fact is that we got more in value than we paid. According to an estimate made by a board of engineers in 1908 the work done in the twelve-mile excavation by the French

was worth to us more than $25,000,000 at our own yardage rates. The same experts valued the Panama Railroad at $9,500,000; the plant and material, used and sold for scrap, the buildings along the line of the Canal, the surveys, plans, maps, and records, at $6,000,000, and land, clearings, and roads with four years' use of the ship channel in Panama Bay at another $1,500,000. The maps on which we built the Canal were made by the French, the surveys on which they were founded having previously been verified by our engineers. And, in addition to the twelve miles of excavation in the present waterway, the French had completed two thirds of the fourteen-mile canal that was to divert the water of the Chagres River under the sea-level plan.

Without considering the ravages of yellow fever, that claimed every third white man who worked on the Canal previous to the discovery that the mosquito was the sole cause of that fearful malady, the French labored under an enormous handicap as compared with the Americans, in that their tools were those of an earlier century. The modern rock drill as used to-day

had not yet been perfected. At the height of our construction work we had over 300 drills at work, one drill runner and four laborers to each four drills. The use of dynamite during the French régime on the Isthmus had not reached the point it has to-day. The Frenchman sank an old-fashioned shaft, put a few pounds of dynamite in it, lighted his fuse, and ran. To-day we can put from 15 to 18 tons of dynamite in one blast, and as much as 30 tons may be fired at once. There were 31 tons in the blast touched off by President Wilson at Washington, when the last barrier between the Atlantic and Pacific sections of the Canal was blown up. During our period of Canal construction at Panama we used 105-ton steam-shovels, which, with a 5-yard dipper, picked up from five to seven tons of spoil every two or three minutes and swung it into a car. The modern steam-shovel was at that date unknown and its capacity undreamed of. The French ran trains of from 12 to 15 cars, carrying from 6 to 12 cubic yards of spoil to the car, while we ran from 30 to 35 cars, carrying from 35 to 40 cubic yards of spoil

each, drawn by one big American consolidation engine. At our dumps we employed a Lidgerwood unloader, which unloaded one of our 30-car trains in 30 minutes, as against 45 minutes required to unload a French 15-car train. The Frenchman had to push by hand the spoil away from the tracks, whereas we came along with a Mann or Jordan spreader and by steam power ploughed the spoil away from the tracks and down an embankment 15 feet from the rails.

That the United States has built a canal where France has failed does not prove that the American is any more capable than the Frenchman, or that he has any more genius than the Frenchman in modern invention. No genius could have taken the American to Panama under the conditions that prevailed during the French régime, and made him remain long enough to produce the living conditions and erect the plant that the French did. The French engineers believed in forced labor, by which the Suez Canal was built, and they brought men to the Isthmus knowing that many of them were going to die there. In a more humane age American engineers would not have constructed the Canal

at the cost of so many human lives per mile, even if the American mechanic would have consented to take the risk, for however big a wage, with the odds on Death against him.

And it should not be forgotten that while the French were dying by scores of yellow fever at Panama, Americans were dying by the hundreds of yellow fever in our Southern States.

It has, unfortunately, been the custom of our American writers on the subject of the Panama Canal to treat achievements of the French on the Isthmus with unfairness, and to fling charges of graft and debauchery at the undefended heads of men who were fighting Fate, under the most terrific handicaps, to secure for their country the prestige of an engineering triumph even greater than that of the Suez Canal.

The French, according to the favorite version, left locomotives in the jungle and long rows of abandoned locomotives and other machinery elsewhere. A Board of Consulting Engineers was appointed by President Roosevelt in 1905, including some of the most eminent engineers in the world, to report to the President on this old French machinery. They found that the

French did not leave locomotives in the jungle. That French equipment is used on the Canal work even to-day is shown by the circular from Colonel Goethals' office dated February 20, 1914, stating: . . . "No French scrap of any description will be loaded by anyone . . . and no parts will be removed for repairing other equipment"; and so far from Time having "made junk of all the French equipment," as has been definitely asserted in an article in *Scribner's Magazine*, the official fact is that a large amount of French equipment is in the service of the Canal work even to-day, and more has been. What was not worked out either by the French or by the Americans in actual work became junk only after the Americans had stripped it of all the movable parts. What was finally left was sold even then by the Canal Commission for over a quarter of a million dollars. These facts are not usually mentioned by any of the self-appointed historians of the Canal in their books or descriptive articles.

The general tendency seems to be to endeavor to cast additional luster on the achievement of our own engineers by ignoring the remarkable

work done by the French. This is neither necessary nor just. And some writers go further, and attempt to disparage De Lesseps personally by magnifying every possible detail of debauchery and extravagance on the part of his men. The British Minister at Panama, Sir Claude Mallett, is quoted to show how quickly French Canal employees could die of yellow fever. That the French Canal officials invariably set their men an example by themselves staying away from and doing all that they could to keep the men away from the drinking and gambling houses is a fact the British Minister at Panama never failed to mention, though this and other statements of his, favorable to the French, are ignored by our journalists, as well the fact that Panama and Colon were free ports and not under the French police power. These details, so greatly modifying all the presumptions of debauchery and extravagance with which the memory of the French are disparaged should be recorded equally with the accusations, as a measure of simple justice.

The wild extravagances of the French form a staple subject of exaggeration.

There was inefficiency and there was extravagance under the French régime undoubtedly, but the reports as to the enormous salaries paid French Canal officials—said to range from $50,000 to $100,000 per year—have been shown to be without foundation. M. Philippe Bunau-Varilla, who was Chief Engineer and General Manager in 1885 and 1886, has made public and unrefuted statements, to the effect that the highest salary paid to a Canal official during the French administration was $20,000, that sum being received by M. Dingler, the first Director General of the work on the Isthmus. M. Bunau-Varilla's own salary was only $10,000 per year at first, being later increased to $12,000.

Moreover, the fact that the official valuation of what the Americans obtained for the $40,000,000 paid the French Company shows it to be worth over $43,000,000 is seldom recorded; while the favorite theory that De Lesseps was a conscienceless grafter has been publicly rebuked by the War Department in giving the name "De Lesseps" to one of the two largest fortresses on the Canal. It should always be remembered,

therefore, that those writers who have attempted to enhance the work of the Americans by contrasting it with the failure of the French, have overlooked the fact that the Americans had the advantage of the French, first, in the development of sanitation and hygiene and the determination of the source of fever infection in the mosquito—thereby enabling the Americans to destroy this source of infection; second, in the improvement throughout the world in all mechanical appliances necessary in canal construction, which occurred since the purchase of the French plant; and, third, in the increased powers of discipline enjoyed by the Americans on the Isthmus, as compared with the French,which grew out of certain rights of sovereignty on the Isthmus which were not enjoyed by the latter. That the American Government has awakened to a realization of these facts—though many writers about the Isthmus have been successful in creating contrary impressions in the minds of the American public—is evidenced by the fact that the Congress has appropriated a sum of money to fit up as a present to the French people the launch *Louise*, used by both French and Amer-

icans as an auxiliary to canal construction; and by the approval of the name of Fort De Lesseps, as already noted. As an interesting side-light on the adoption by the French Canal Company of the lock-type of Canal, as opposed to the sea-level type, it is worthy of note that Lieutenant (now Rear-Admiral) Robert E. Peary, of North Pole fame, in association with Lieutenant Menocal, also an officer in the American Navy, in 1884 and 1885 personally and under orders of the Navy Department, made a re-survey of the Nicaragua route. In their report of 1885 is described and illustrated the type of Canal along the lines of that now completed at Panama. Some engineers assure me that this was the first description in a public print of such a type.

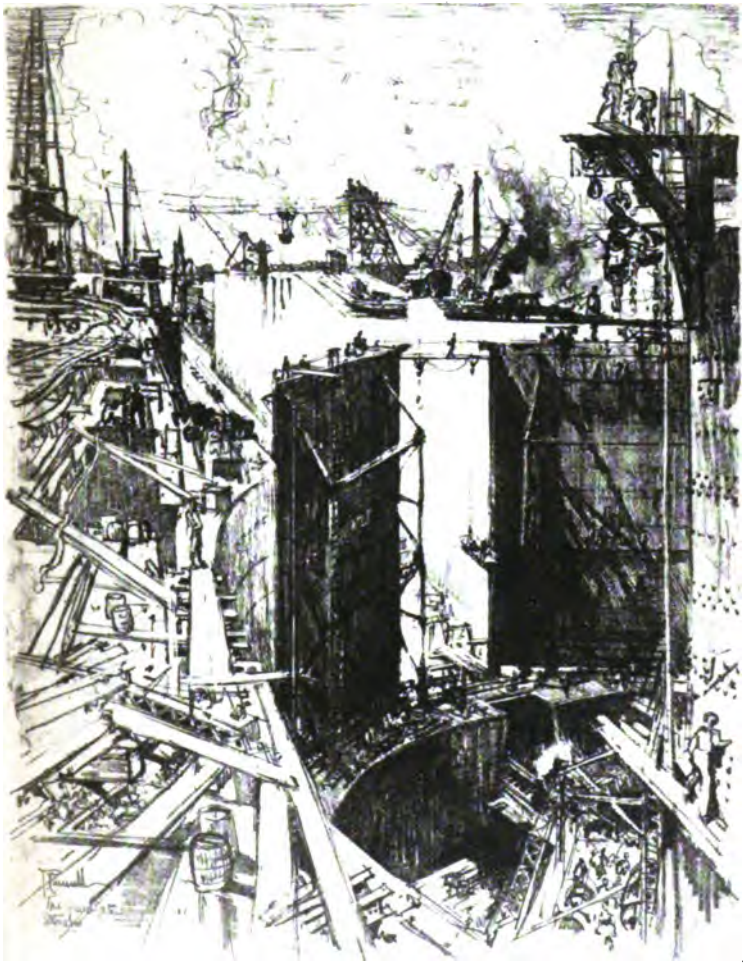
Their report also described and detailed a feasible high-lift lock with water-ballasted gate. This gate was designed by Lieutenant Peary as a rolling caisson gate with all operating machinery above water-level.

It was not until after the report of Lieutenant Peary and Lieutenant Menocal was published in 1885 that the French Canal Company changed its plans from those calling for a sea-

level canal at Panama to the lock-level type. It is fairly certain, therefore, that the French were influenced in their resorting to the lock-level canal at Panama, to overcome their failure to carry out the sea-level plan, by this report of the discoverer of the North Pole and his associate, Lieutenant Menocal.

The First Isthmian Canal Commission, which took over the construction of the Canal from the French, was known as the Army and Navy Commission. It was appointed by President Roosevelt in February, 1904, and was headed by Rear-Admiral John G. Walker, U. S. N., while Major General George W. Davis, U. S. A. (retired), was made governor of the Canal Zone and the responsible head of the work at Panama, with John F. Wallace as chief engineer. The other five members of the Commission, like Mr. Wallace, were civil engineers of the highest standing, William Barclay Parsons and William H. Burr of New York, Benjamin M. Harrod of New Orleans, Carl E. Grunsky of San Francisco, and Frank J. Hecker of Detroit.

The failure of the Army and Navy Commission, according to one of its members, was due to



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a misconception on their part as to their duties, in that each attempted to fulfill a joint obligation instead of together constituting an organization and formulating a policy. More than one of the seven members of the Commission felt himself individually responsible for every barrel of crude oil and every typewriter purchased for the Canal Zone. In the septemvirate were men who thought that every document issued by the Commission should be read by each of its members, with the result that not infrequently a letter of instructions—for, perhaps, the chief engineer—that had been prepared by the Chairman, would be a week or more in passing across the desks of the other six commissioners before getting started for Panama. There were seven able men on the First Commission, to whom duties seem to have been assigned without regard to their vocational training. The commission that controlled the construction of the canal sat at Washington, General Davis being the only member on the Isthmus. At these headquarters 2000 miles from the site of the work, five eminent engineers estimated the number of grains of quinine per capita that might be

required in the Canal Zone, or debated the wage to be paid a cook. Mr. Wallace, the chief engineer of the Canal, on the ground at Panama, was not permitted to make the appointment of an employé at a salary exceeding $1800 per year without the formal approval of the Commission at Washington; and, most preposterous proposition of all, he was restricted in the use of the cable in making recommendations or requisitions, although eight days were required for the transmission of a letter between Canal headquarters and the Canal Zone. Work involving the expenditure of hundreds of millions of dollars subjected to delay, in order to save the trifling expense of telegraphic communication!

Army and Navy methods were followed on the Isthmus as in Washington. A Navy paymaster was appointed general storekeeper, and another disbursing officer, while an Army officer was made quartermaster in charge of furnishing labor and providing for its maintenance. The administration of the ramshackle Panama Railroad, an indispensable instrument to the construction of the Canal, was left by the com-

mission as it had been found. The delivery of track supplies requisitioned by Mr. Wallace for the rehabilitation of the railroad, which could be purchased in New York and put aboard ship within six hours, was often delayed for six months by Washington red tape. The Army and Navy system of accounting was introduced on the Isthmus. By this system pay-rolls were made in duplicate, each of which had to be signed by a division engineer and the employé (provided he could write; otherwise he made his mark), and approved, sheet by sheet, by the chief engineer—with such results as to facility in mere physical handling that, in a not exceptional instance, the paper contained in two weeks' pay-roll of 1500 laborers, drawing 20 cents an hour, registered a weight of 103 pounds. If an exploration party was sent away from camp, two methods of providing themselves with food were open to the men. Either each member paid for his own supplies, and was reimbursed by the Commission on handing in vouchers signed in quadruplicate for the cost of his alimentation, or the chief of the party paid for all supplies out of his own pocket, making out

six vouchers for each and every individual to sign, which vouchers being then approved by him, his advances would be returned by the Commission. Carts and wagons were hired by the week from Isthmian natives, six Government expense vouchers being essential in the payment for the use of each vehicle. Before the Army and Navy accounting system was superseded by that of the railroad men, after the inauguration of the latter in the Canal Zone, the division engineer in charge of the paving of the City of Panama, who had employed 200 carts during one week, found himself with 1200 vouchers to fill out on Saturday night for one part of the work alone.

In the operation of storehouses the First Isthmian Commission followed Navy methods. "Tie plates" that reached the Canal Zone bound together with wire for the purpose of easy handling and rapid use, would be cut apart and neatly piled up like bolts of cloth. Right and left angle bars for rails were unbolted and piled up in the same manner, with the result that when they were needed for use the storekeeper usually sent out all rights or all lefts,

this being the cause of many delays, particularly on the Culebra Division. On one occasion, when the water system in the City of Panama was in course of installation, a hurried requisition was made on the storekeeper for a couple of hundred of what are known as "service cocks"; and, as he professed to be unable to supply them, they were cabled for to Washington. A day or two after sending the cable, the division engineer in charge of the work happened to visit the storehouse, when to his surprise he found some 2000 service cocks such as he had made requisition for, and inquired why his demand had not been complied with. The storekeeper's explanation was entirely adequate from the Navy point of view. It was to the effect that the rule was that 2000 service cocks always be kept on hand, "stock" never being allowed to run below that number. There is little doubt that what was called the "water famine" in Colon was due to the inefficiency of the storekeeper's department, which proved unable to supply material that might have been obtained in any of the larger cities of the United States. It was sometimes almost impossible for the Canal employés to

obtain food, even when they had money and there were ample supplies in the commissary storehouses, because of Navy methods. Just after the inauguration of the Second Isthmian Commission, the men at Empire and Culebra once faced starvation, a condition due to an order from the auditor directing that on a certain day the system at that time employed for the delivery of supplies to Canal employés be discontinued and a new system inaugurated. On the day specified, the new system was not in operation at Culebra and Empire; and, as the old system had been superseded, under Navy regulations the storehouses at these points remained closed. On this occasion actual suffering from hunger was averted by Chief Engineer Stevens, who took a special train from Panama to Culebra, overruled the auditor, and opened the storehouses.

General Gorgas, who extirpated yellow fever from the Canal Zone under the railroad men's administration, was also chief sanitary officer on the Isthmus during the entire Army and Navy régime. During this period he accomplished practically nothing in his battle against

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Surgeon-General William C. Gorgas
Chief Sanitary Officer of the Canal Zone
from 1904

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disease, although a plan for the sanitation of the Zone and the cities of Panama and Colon had been reported by the sanitary experts, appointed by President Roosevelt, who accompanied the Commission on its first visit to Panama in March, 1904. Colonel Gorgas' efforts were also hampered by the circumambient red tape of the Navy; and, so little headway was he able to make under those conditions that June, 1905, the month before Mr. Shonts reached the Isthmus, was that of the greatest mortality from yellow fever at Panama in many years. Four months after the arrival of Mr. Shonts, yellow fever was a thing of the past in the Canal Zone.

Both Mr. Wallace and General Gorgas were bitter in their complaints to the Secretary of War as to the inefficiency of the Army and Navy Commission, their requisitions for supplies being either disregarded altogether or granted only in part and after long delays. In an address two years ago before the Chagres Society, composed of the white workers on the Canal who have been in the service for six years, General Gorgas made a humorous reference to Admiral Walker

which nevertheless throws some light on the situation. "The Admiral was a very able and capable man," said General Gorgas, "but he had a few set ideas in regard to the administration of the Canal which he was determined to carry out. The principal of these was economy. Day after day I would go to the Admiral with requisitions for various things needed, and we would talk the matter over. He would always get on the subject: 'Gorgas, there is one thing certain; whether we build that Canal or not we will leave things so fixed that those fellows up on the hill can't find anything in the shape of graft after us.' He would then take my requisition and stick it in a drawer, and there it would remain for an indefinite time." To add to the difficulty of the 1904 situation, the Commission made the tactical error of yielding to the clamor of the American newspapers that has taken up Mr. Roosevelt's phrase about "making the dirt fly." Mr. Wallace was ordered to go on with the work of excavation on the Isthmus with the out-of-date machinery left by the French, even though the type of canal had not yet been decided upon; the railroad that

was essential to the disposal of the soil was practically useless; and there was no suitable food supply or quarters for the few laborers on the ground.

Mr. Taft summed up the situation at Panama in 1904 and the early part of 1905, in his testimony before the Senate Committee on Interoceanic Canals in April, 1906, thus: "The chief defect of the old Commission, if I may say so, became apparent when it essayed the tremendous executive task of perfecting an organization to furnish the equipment, the material, and the supplies required in increasing quantity on the Isthmus as the work expanded, with promptness and dispatch."

CHAPTER II

PANAMA IN 1905

It was a rather gruesome jest that greeted five Panama Canal Commissioners, who arrived at Colon before the sanitation of the ten-mile strip of American territory across the Isthmus, after a week on shipboard *en route* from New York, during which period almost the only topic of conversation, participated in by passengers who had visited that part of the world before, had been those manifold diseases by reason whereof Panama and the Chagres River connoted death by fever and pestilence the world over. It so happened that five mahogany burial caskets near a consignment of plain cherry coffins—the trade in mortuary paraphernalia being brisk on the Isthmus at that time—were by chance piled on the wharf close to the baggage of the Commissioners, when they came down the gangplank from the ship.

"Why those coffins with our trunks?" one of the new arrivals inquired of the American baggageman in charge.

He was a facetious American, this baggageman, and his organ of veneration seems to have been as rudimentary as his sense of veracity for he replied blandly:

"Five commissioners, five superior coffins—a speculation on the part of an undertaker."

That, at least, is a story that was told at the time, and it fitted existing conditions in the Canal Zone. Indeed, John F. Wallace, who was Chief Engineer of the Canal from June, 1904, to June, 1905, brought his personal coffin with him from New York when he came to Panama —a precaution the significance of which did not tend to encourage the rank and file of the men employed on the big ditch.

In the spring of 1905 an epidemic of yellow fever occurred on the Isthmus, and among the earliest victims were two of the highest of the Canal officials under the First Commission, Morris O. Johnson, the Supervising Architect, and Robert R. West, the Deputy Auditor. Their deaths brought about a stampede among

the white men of lesser stamina. Some 500 of the American employés resigned their positions and left Panama during April, May, and June. At the height of the epidemic Chief Engineer Wallace secured leave of absence from the Secretary of War and sailed northward. The fact that he took his coffin with him gave rise to the surmise (soon proved to be correct) that he did not intend to return, and something like a panic ensued. It is probable that many hundreds more of the Americans in the employ of the Isthmian Commission would have gone back to the United States than did actually return, save for the fact that the steamship fare was prohibitive. The trip to New York cost $75 when a man traveled as a private citizen, whereas Canal employés were allowed a special rate of $20 when going home on leave. Many of them took leave of absence at this period, and left the Canal Zone with no intention of ever coming back, and even the loyal employés who remained worked under a strain that showed in their faces. However, depression never reached a point where the American sense of humor was entirely crushed. A clerk in the

Commissary Department, on an afternoon when the fever was at its worst, under nostalgic influences suddenly struck up the familiar prayer-meeting hymn that begins:

> "There's a land that is fairer than day,
> And by faith we can see it afar——"

That he had the United States rather than the celestial regions in mind was apparent when he paused at the end of the second line to observe: "Add $75 to faith and you can get there by a United States Fruit Company boat."

Disbursing Officer Edward J. Williams, who came to Panama that summer (and remained until the practical completion of the canal in 1913), described the situation as it appeared to him briefly: "Everybody here seems to be sitting on a tack," he remarked.

Writing afterward of the yellow-fever outbreak of that season, Col. William C. Gorgas, who was subsequently to make an international reputation by the sanitation of the Canal Zone and who had been on the Isthmus a year when the epidemic in question began, said: "Our people very generally looked upon the mosquito

theory as a failure. The natives laughed at us."

It was not only on the Isthmus that the possibility of an inter-oceanic canal seemed remote. News of depressed and alarming conditions reached the home newspapers by every steamer from Panama arriving at a United States port. In May the *New York Herald* published an interview with John Barrett, on his return to this country after resigning the post of Minister to Panama, in which the diplomat declared: "Despite the efforts of the present sanitary staff under the skillful guidance of Colonel Gorgas, yellow fever seems no nearer being stamped out than it was a year ago. We have had more cases of the dread disease during the last thirty days than any other corresponding period for ten months." About the same time an article appeared in the *New York Tribune* that began: "It appears that the yellow-fever scare on the Isthmus of Panama has not abated and that conditions are serious there. This appeared yesterday in the return by the Panama Line steamship *Seguranca* of thirty young men who went down to work for the Canal Commis-

sion. All were coming home because they were alarmed over the fever scare." The same week the New York *Times* published the following dispatch from Pittsburg:

"'Tell the boys to stay at home if they get only a dollar a day,' is the advice of a McKeesport boy now working with the construction gang on the Panama Canal.

"Charles L. Carroll, son of Mrs. Sadie Carroll, of 604 Ridge Avenue, McKeesport, was one of the first to go to the Isthmus to work. In a letter to his mother, received yesterday, he says he is thoroughly sick of the country and everything connected with the Canal.

"'Everybody is afflicted with running sores all over the body,' the letter goes on. 'We are compelled to sleep in an old shed, six in a room, on cots. Rain water is drunk more than the river water, because it is the better. The meals provided, would sicken a dog.'"

Carroll's statement that every person (presumably in Panama) was afflicted in the manner of Job was something of an exaggeration, doubtless promulgated with a view to exciting the sympathies of Mrs. Sadie Carroll, and perhaps

of inducing her to send him the wherewithal to remove himself from his pustulous environment, but it was accepted as hideous truth by the large number of unthinking people that helps to populate this and other countries. The "running sores" of which the young man complained were doubtless due to that non-respecter of persons, the tick, which creeps under the skin of, and battens upon, the genus *homo* in most parts of the world, impelling him to scratch himself violently at points of contact, thus producing minute ulcers with a watery discharge. Carroll's observation as to the potential effects of Zone food on the canine epigastrium had also some foundation in fact.

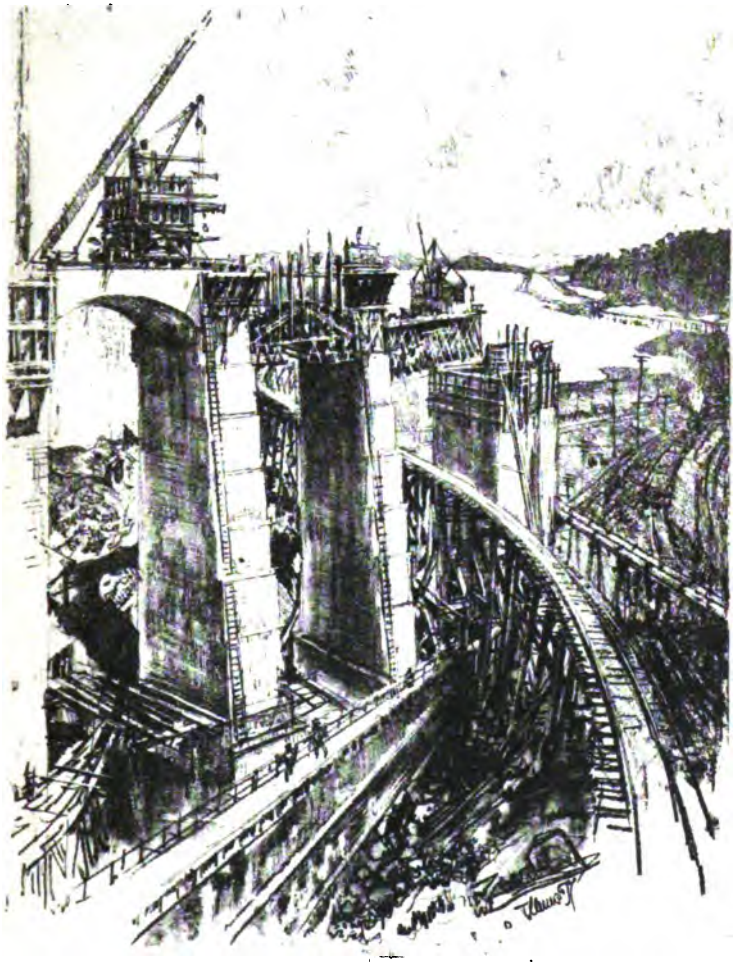
Newspapers in other cities than New York contributed tales of disaster at Panama to the current record. For instance, the Cincinnati *Enquirer* published a letter received by "John J. Wenner, clerk of the County Board of Control," from a former resident of Cincinnati in the Canal Zone, who prophesied that at the rate work on the Canal was then progressing the big ditch might be opened in 1950, and declaring that Panama was a cesspool, with yellow fever claim-

ing a white victim there every ten days. The Washington *Times* cited Canal employés returning from Panama because of the high cost of living, as well as by reason of the yellow fever epidemic; and it is probable that every newspaper in the United States printed interviews with the returning members of the committee appointed by the Japanese Government to investigate labor conditions on the Isthmus, who reached New York in May, and were unanimous in the view that Panama was no place to which to send workingmen who did not court death.

On the Isthmus during the spring and summer of 1905 *Memento Mori*, albeit not in the written word, everywhere stared the visitor in the face. Yellow fever was epidemic, as has been stated, and to its ravages were added those of bubonic plague and many minor disorders. In the cities of Colon, Panama and Ancon, funeral processions were continually passing in the streets, and groups of mourners were gathered at the doors of the churches from morning until night. Coffins consigned to undertakers in the various working camps were piled up at the stations of the Panama Railroad in such numbers

that the authorities ordered them to be stored out of sight, for fear of their effect upon the public mind.

At Ancon a building was pointed out in the Hospital grounds, where, it was asserted, 5000 patients had died under the French régime on the Isthmus. A structure on Ancon Hill in 1905, known as "La Folie Dingler," or Dingler's Folly, which has since been razed to make room for the work of the Canal, stood for years a yellow fever memorial. This was the residence of Jules Dingler, which overlooked La Boca (now Balboa), and the Bay of Panama. Dingler was the first Director-General of Canal Construction under the French régime, and he brought his family consisting of wife, son, and daughter to Panama with him. After his house was completed and furnished, but before he could occupy it, the wife, son, and daughter fell victims to yellow fever. Dingler returned to France, where he soon died—of a broken heart, it was said. His successor, Leon Boyer, arrived at Panama in January, 1886, and succumbed to yellow fever the following May. Every white man who came to work on the



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Approaches to Gatun Lock

Isthmus during the French régime, as General Gorgas has said, knew that he would have yellow fever, and he knew that every third man would die. There were actual figures on record to show that of a family numbering five of one of the chief engineers during the French régime, four had died; that of the family of a French official of the Panama Railroad also numbering five, three had died; that of seventeen French engineers who had arrived on the same steamer, sixteen had died; that of twenty-five Sisters of Charity who came to the hospital at Ancon at one time, twenty had died. It was on record that in September, 1884, an outbreak of yellow fever in the Harbor of Colon cost the lives of twenty sailors, a British brig losing all her crew save one, while among the white men in the city itself there were 160 cases of the dread disease with a mortality of more than two thirds. Estimates of the total number of victims of yellow fever during the nine years the French were excavating on the Isthmus vary, but often reach large figures. Colonel Gorgas fixes the number at approximately 22,000, and according to so high an authority it is reasonable to say

that one third of the Frenchmen who came to Panama during the period from 1882 to 1891 died of this disease. In the summer of 1905 every American in the Canal Zone was speculating as to whether the United States Government would attempt to build the Canal at a possible like cost in human lives, for there were as yet no indications that our sanitary department would be able to cope successfully with the death-bearing mosquito—the "cobra of the air."

During his first week on the Isthmus, Chief Engineer Stevens had the actuality of the yellow-fever peril brought home to him forcibly. A clerk in his office, who had seemed perfectly well when he went home one night, did not report for duty in the morning, but sent word that he was not feeling well. He died of the fever in the afternoon. Having myself gone unscathed through the smallpox epidemic of 1898 and 1899 in North China, one of bubonic plague in South China the next year, and the cholera epidemic in the Philippines that claimed many thousands of victims the year following, I was inclined on reaching the Canal Zone to

regard the apprehension of my associates as to contracting current maladies without any overflow of sympathy. Consequently, when I was bitten by a mosquito on the back of the hand one evening soon after my arrival, I decided to forget the incident. However, I found myself unconsciously making a computation. Besides the stegomyia that conveys yellow fever, there thrived in Panama the anopheles mosquito, the conductor of malaria, and the common black, and several other breeds, contact with which was conducive to nothing more serious than violations of the Third Commandment. Wherefore there was only one chance in three that I had been bitten by the mosquito most to be dreaded. Even if the creature had been a stegomyia, yellow fever need not of a certainty follow, since in order to convey the disease it must have punctured the integument of someone afflicted with it, and I had a further chance of escape in that this perforation must have been effected within three days of the patient's coming down with the malady. The odds, therefore, were five to one against my going to the hospital. The period of

incubation of yellow fever is five days, and I am willing to admit that when I wakened without any symptoms of disorder on the sixth morning after being bitten, I was somewhat relieved—I may even say, considerably so.

Mr. Shonts retains to this day a vivid recollection of a *mauvais deux heures* of his own soon after his arrival on the Isthmus in July. He recalls that on the morning of his first day the sight that greeted his eyes on looking from the window of the cottage where he was quartered in Colon was the passing of ambulances carrying yellow-fever patients; and, as that disease was the main topic of conversation among the Americans in the Canal Zone, one of the earliest bits of information imparted to him there was that the period of development of yellow fever is five days. When, therefore, he awakeend on the fifth day after his arrival with his temperature considerably above normal and announced the fact at breakfast, the others at the table insisted on sending for a doctor. When the man of science had taken a blood sample from Mr. Shonts and gone to make an analysis, an old-timer on the Isthmus remarked:

"He'll be right back, if his first examination is favorable. If there is any evidence of infection, however, he'll be a long time coming to a decision."

Half an hour, an hour, two hours, passed, and the men with Mr. Shonts began to show signs of nervousness. Then the doctor ran into the room with many apologies for his prolonged absence.

"Your blood is in perfect condition," he told his patient. "There are not even any malarial symptoms. I should have brought you the information immediately, only that I received an urgent summons to a man just stricken down with the real fever, and could not leave him until now."

Isthmian statistics seemed to show that yellow fever found its victims only among those not natives of the tropical coast towns. White men from the temperate zone, and natives from the hills and mountains were subject to the disease, but the negroes from Jamaica and Trinidad and the Caribbean Sea, as well as the Panamanians themselves were immune. The field of attack by yellow fever was somewhat limited,

therefore, and the disease could not be propagated without a yellow fever patient. The stegomyia was a delicate and short-lived creature withal; in captivity it rarely lived more than five weeks, and out of captivity probably not more than ninety days; furthermore its range of flight was seldom more than a thousand feet from its point of nativity. It was not often hatched in the open air, however, but generated in stagnant water in forgotten corners of cellars and dark rooms of tropical houses, in neglected household utensils and closets and puddles in back yards. One of the horrors of the situation on the Isthmus before the discovery that the mosquito was the sole transmitter of yellow fever, lay in the fact that the stegomyia was actually bred in the hospitals. The French physicians put the legs of the hospital beds into water-filled receptacles in order to prevent insects from crawling up to annoy the occupants, and in these very receptacles were born the mosquitoes which with the minimum of labor carried the disease from the hospitals to the world outside. It was found that if there was no new case of yellow fever sixty days after

an epidemic, the assumption that the disease had been stamped out was safe, since all the carriers would be dead of old age by that time—this would certainly be the fact after ninety days. At the end of this ninety-day period the stegomyia would be harmless so far as yellow fever was concerned, since it could secure no germs with which to inoculate a potential patient without a real patient to supply them.

The anopheles mosquito, which carried the malaria germ, was a hardier creature; it bred in the country districts, in marshes, in pools of stagnant water anywhere and everywhere. Examination for scientific purposes under the direction of Colonel Gorgas in 1904 and 1905 showed that at least 70 per cent. of men and women picked up at random on the Isthmus of Panama had the malarial microbe in their blood. A victim of malaria seldom died of the malady, but he was capable of supplying its germ to any anopheline mosquito making integumental borings within three years of first infection.

Even leaving disease out of consideration, the Canal Zone was not a cheerful place in 1905. Chief Engineer Stevens expressed his opinion of

the two principal cities on the Isthmus, as he found them on his first visit, to the Oregon Society of Engineers several years afterward. "Colon at the northern, and Panama at the southern, terminus of the Canal, were, up to 1907, two of the most forbidding, dirty, and from a white man's point of view, unhealthy places on earth," he told his auditors. A visitor to the Isthmus as late as February, 1906, described the impression produced on him during the journey from Ancon Harbor to the City of Panama, without much enthusiasm. "We went ashore and were loaded into a dusty, ancient, ramshackle train into which a self-respecting cow would have refused to be driven, in the United States; we were man-handled by violent negro train-hands and a conductor who wore a large diamond in his necktie and who thrust his cash-fare collections into his trousers pocket without ringing a bell punch or giving a receipt," he said. "We were unloaded on the outskirts of Panama at a baking-oven of a station, surrounded by a dust field with a fringe of flea-bitten horses, tumble-down hacks, and saloons which were likely to fall in at any moment upon

the wrecks of humanity which crowded the bars. We were driven through streets as rough as any Maine woods lumber roads, past houses where naked mongrel children, tow-headed and kinky-haired together, screamed under the chastisements of slatternly mothers; we were housed in a hotel where a meek request for the interpolation of sheets between the counterpane and the mattress ticking was met with a smile of amused though contemptuous compliance. In all the world there is not another city so depressing as Panama. Natives and aliens go through its streets with dragging feet and saddened faces. I saw a cab-horse, standing in front of the dismal public square, move a few inches forward so that he might lean against a telegraph pole—and the action was so much in the spirit of the town that it did not jar upon my perceptions as remarkable until long afterward. We wondered how American white men of decent tastes could stay more than six weeks in such a hole and keep their reason."

The most pretentious edifice in the City of Panama is the palace of the Roman Catholic Bishop, the first floor of which is occupied by the

Panama Lottery and those above by the prelate himself. Up to the time of the sanitation and sewering of the city by the railroad men, the cellar of the Bishop's palace was devoted, half and half, to a cesspool and a cistern, from the latter of which was drawn all water, for drinking and other purposes, used in the sacerdotal ménage, the two receptacles being divided by a thin wall.

Colon was called by the French, "the white man's graveyard." Its founders selected for the site of the town a morass on which eleven feet of water fell annually, and its streets—which were almost waist deep in mud during the rainy season lasting eight months of the twelve—served the functions of a sewer as well as that of a thoroughfare, the householders conveniently disposing of their garbage and offal through the front door. The other settlements of the Canal Zone were as lugubrious as Panama and Colon. The people depended largely on unprotected cisterns for their water supply, filled during the wet season, and on barrels filled from neighboring streams, all breeding places for mosquitoes. The filth of ages had accumu-

lated around the dwellings and in the streets, undisturbed except when washed away by torrential rains. Pools of stagnant water had existed for years in proximity to dwellings, and insect-breeding swamps lay undrained adjacent to the cities and many of the towns. Owing to the fact that the Panama natives never looked beyond their present necessities, no food ever accumulated on the Isthmus, and in the summer of 1905 this disastrous condition was augmented by an almost total failure of the crops for the two preceding years, by the abandonment of agricultural laborers of the farms back in the hills for work on the Canal at better pay for shorter hours, and by quarantine of the port of Panama because of bubonic plague, which prevented the delivery of foodstuffs from neighboring provinces.

Such were the physical conditions at Panama when the railroad men, under the direction of Theodore P. Shonts, Chairman of the Second Isthmian Commission, assumed control.

CHAPTER III

THE RAILROAD MEN TAKE CHARGE

I FIRST heard the name of Theodore P. Shonts, who that year became a national figure, in March, 1905, at which time I held the position of assistant chief of the Bureau of Insular Affairs which dealt with civil matters in the War Department. The President had some time before reached the conclusion that the First Isthmian Commission, of which Rear-Admiral Walker was Chairman, had not—to use the language of Mr. Taft—"so developed itself into an executive body as to give hope that it might be used successfully as an instrument for carrying on the immense executive burden involved in the construction of the canal," and it was a matter of common knowledge that the formation of a new commission was under consideration. President Roosevelt had wisely decided to select a railroad man to head this

commission, for, after all, the big problem of the Canal was one of transportation—the moving of the excavated material from the cut to the spill banks, and the moving of sand, rock, cement, and iron to the points for the location of the locks along the route.

On March 18th, Secretary Taft prepared a letter, identical copies of which were sent to leading bankers and railroad and transportation men of the United States, whose assistance and advice the President solicited in the selection of a chairman for the proposed new commission —he having this Mr. Shonts, whom I had never heard of before, in mind for that all-important position.

Mr. Taft's inquiry was worded thus:

"I am charged by the President with making some inquiries concerning Mr. Shonts, at present the President of the Clover Leaf Railroad, with a view to learning his qualifications for carrying on, as the chief executive, the great work of constructing the Panama Canal.

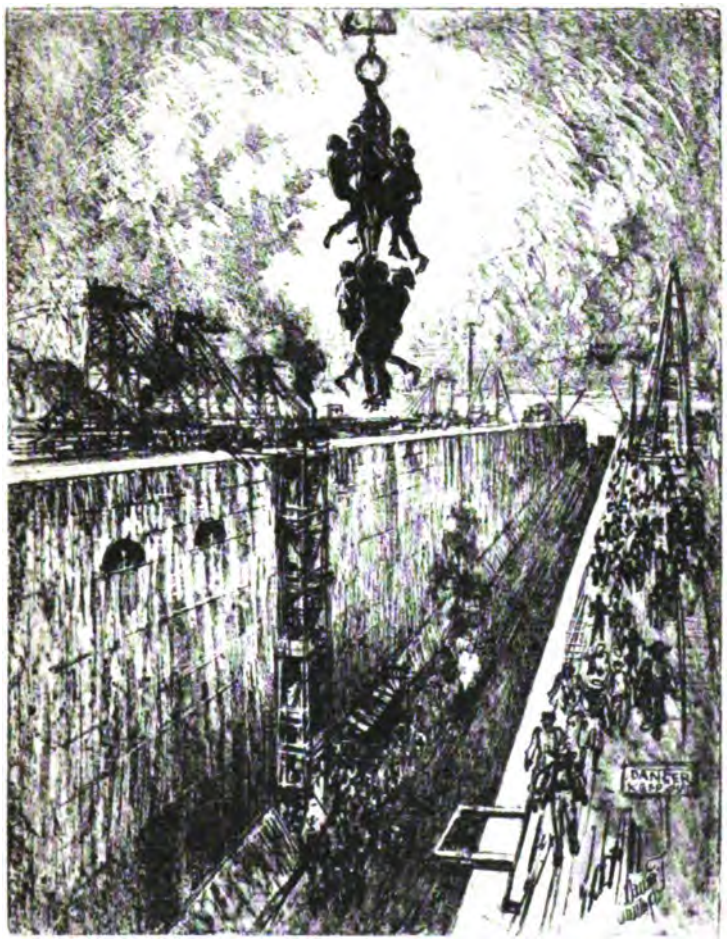
"I am informed that Mr. Shonts has had much experience in works of construction, and has shown the capacity for pushing things and making

work go that is so much needed in an enterprise like that of building the Canal.

"Would you be good enough to give me your estimate, confidentially and privately, for reference to the President, of Mr. Shonts' capacity for this work? Mr. Shonts is not an applicant, and I am not certain that he would accept the appointment if tendered him, but before tendering it I should like to get the judgment of men who know him.

"An immediate answer to this would greatly oblige me."

The men to whom transcripts of this letter were sent were William H. Newman and William C. Brown, then respectively President and Vice-President of the New York Central and Hudson River Railroad Company; the late Corwin Spencer, at that time connected with the Louisiana Purchase Exposition at St. Louis; the late Edwin Hawley, President of the Iowa Central Railway; Wm. A. Read, of Wm. A. Read & Company, and the late Gordon MacDonald, of Speyer and Company, New York bankers; Oscar G. Murray, President of the Baltimore & Ohio Railroad; the late Robert Mather, Chairman of the Executive Committee of the



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End of Day Gatun Lock

Chicago, Rock Island & Pacific Railroad; Gen. Thomas H. Hubbard, of the International Banking Corporation of New York; and the late H. S. Redmond of New York.

The replies to Secretary Taft's letter[1] gave me a lively interest in the personality of Mr. Shonts, for it had been my observation that when a confidential inquiry is made among men as to the ability and integrity of an individual, at least two thirds of the responses are what is known in the vernacular as "knocks"—a condition due not solely to temperamental biliousness but also to the circumstances that the endorser of another's character is in the same mortal position as that in which he would find himself pecuniarily if he had endorsed his note, in the event of a default. In the instance of Mr. Shonts, however, every one of the men to whom the Secretary of War addressed his inquiries made reply that the President of the Clover Leaf was exactly the man to build the Panama Canal.

On the day the last one of the responses was received, Mr. Taft at once went with them to

[1] See Appendix, page 363, "Some Letters about Mr. Shonts."

the White House. On his return half an hour later I learned through Colonel Edwards, the Chief of the Insular Bureau, that Mr. Shonts had been offered the job.

The offer of the chairmanship of the new Isthmian Commission was cabled by President Roosevelt to Mr. Shonts, and reached him on March 25th while he was cruising in West Indian waters on the United States dispatch-boat, *Dolphin*, with Senator Hale of Maine, and Representatives Cannon of Illinois and Meyer of Louisiana, as guests of the late Paul Morton, Secretary of the Navy. The message was delivered on board the *Dolphin* at Guantanamo, our naval station on the southeast coast of Cuba. The offer came as a complete surprise to Mr. Shonts, for Mr. Roosevelt had requested him only a short time before to give an opinion as to the respective merits of two candidates for the chairmanship of the Commission he was himself now asked to accept. However, there was ample opportunity to consider the proposition during the several days that elapsed before Secretary Morton and his guests went ashore at Fernandina, Florida, where they took train for Washington.

The President's message being in no sense a confidential one, the pros and cons of the Canal project were a frequent topic of conversation among the *Dolphin's* passengers during the last week of their cruise. The President of the Clover Leaf, who had previously confined his activities to the construction and operation of railroads, was a novice in politics; and what the sophisticated politicians on the dispatch-boat told him about the deadly handicap upon efficiency that bureaucracy and red tape proved to be in the transaction of governmental business, did not tend to engender within him any lust for the Panama job. The day before the *Dolphin* reached Fernandina, Mr. Shonts told the others on board that he had about decided to decline the President's offer.

"You are dead right," said Mr. Cannon. "Unless you can get assurances from the President that you shall have absolute control at Panama; that you are to conduct operations exactly as if the Canal were a private enterprise of your own, you couldn't get the work done in twenty years. Politics is the greatest menace to the Panama project, and you can't keep it

out of politics—unless, as I say, the President will give you absolute control of every detail of its construction and of the affairs of the entire Canal Zone."

The Morton party reached Washington on the morning of April 1st, and Mr. Shonts went immediately to the White House to keep an appointment with Mr. Roosevelt made by telegraph the previous day. The President greeted his visitor with even more than his usual cordiality, and then got right down to business.

"Well, Mr. Shonts," he said, "I hope that you have come to tell me that you are prepared to accept the chairmanship of the Isthmian Commission."

"I have an idea, Mr. President," Mr. Shonts replied, "that when you learn the conditions under which I am willing to accept your offer, you may withdraw it. One of the troubles with the present Commission is that it has too many heads, for there is bound to be friction so long as responsibility is divided. I cannot accept the chairmanship of the new Commission, therefore, unless it is understood that I am to have absolute authority as to both men and

measures in the work of the construction of the Canal—subject only to your approval. Under other conditions I do not care to assume the enormous burden or responsibility involved in the great enterprise you have undertaken."

The President listened to his visitor, nodding his approval of every sentence he uttered, and as soon as he had concluded threw open the door of his office and invited in the newspaper correspondents, representing the Fourth Estate of the Nation, whom he had summoned with the promise of important news that morning.

"Gentlemen," he said to them in tones that indicated a high degree of satisfaction, "allow me to introduce the Chairman of the Second Isthmian Commission, who is to have absolute control in the construction of the Panama Canal."

When the correspondents had hurried away to send to the afternoon newspapers the information that the task of excavating the waterway between the Oceans, with absolute authority as to men and measures, had been assigned to a railroad man of the Middle West, Mr. Shonts told the President that there was another

condition under which he entered upon the undertaking.

"Of course," he said, "it is at a material sacrifice that I give myself up to the Canal enterprise, for I shall be compelled to neglect weighty interests of my own. On the other hand, I appreciate the compliment implied in choosing me to head a project in which the national honor may be said to be involved, and, indeed, consider the performance of the task I have assumed to be a patriotic duty. Nevertheless, I must ask you to allow me to return to the conduct of my own affairs as soon as the work of the construction of the Canal is under full headway, with all mechanical problems solved and an organization effected capable of carrying the scheme to its consummation."

Mr. Roosevelt was inclined to object to Mr. Shonts' second condition, but he finally consented to it. Mr. Shonts lost the glory that now pertains to Colonel Goethals by asking the President to release him from the Canal organization after its construction was under full headway early in 1907, but he did not surrender control at Panama until convinced that the

completion of the work was merely a matter of routine that might be accomplished by any highly competent executive.

It may be mentioned incidentally that nine months after Mr. Shonts' acceptance of the chairmanship of the Second Isthmian Commission, when under his energetic administration it had extirpated yellow fever from the Canal Zone; provided the workers of all grades with suitable and sanitary quarters; converted the Panama Railroad from an antiquated, inadequate, and dilapidated relic of an earlier century into an up-to-date system; built new wharves, equipped with modern mechanical appliances at both terminals; erected extensive warehouses and machine shops, and expended some $10,000,000 in the assembling of an operating plant for the actual work of excavating the Canal, certain members of Congress began to interest themselves in the fact that he was in receipt of a salary as President of the Clover Leaf Railroad, in which he was a large stock-holder. In spite of the fact that he was doing fourteen hours' work per day for the Government as Chairman of the Isthmian Commission, and that he had

delegated his duties as President of the railroad to his associates, our sapient legislators seem to have believed that he might accomplish more if his nominal connection with the Clover Leaf was terminated. Mr. Roosevelt mentioned this circumstance to Mr. Shonts with many apologies, but asked him how he felt about discontinuing his railroad salary.

Mr. Shonts remarked—with an element of logic, it will be admitted—that it was the Clover Leaf people who ought to object to continuing his salary.

"However," he said, "I shall do nothing to embarrass you in the construction of the Canal, and if it becomes necessary I will drop the Clover Leaf salary. I will even dispose of my holdings in the railroad if that will facilitate matters at Panama. The paramount issue with me at present is the Canal."

The President suggested that the matter be left in abeyance a few weeks. It was never brought up again, and Mr. Shonts remained the nominal President of the Clover Leaf during his connection with the Isthmian Commission.

On the same day that Mr. Shonts accepted

the chairmanship of the Second Isthmian Commission, April 1, 1905, and after a conference with him, President Roosevelt announced the names of the other six members. They were Charles E. Magoon, who was assigned to the governorship of the Canal Zone; John F. Wallace who, in addition to retaining his post as chief engineer of the Canal, was elevated to membership in the Commission; Rear-Admiral Mordecai T. Endicott, U. S. N.; Brigadier General Peter C. Hains, U. S. A. (retired); Colonel Oswald H. Ernst, Corps of Engineers, U. S. A., and Benjamin Harrod, the New Orleans civil engineer, who was the only member of the first commission to be named on the second.

The building of the Canal was nominally under the direction of the Secretary of War during the railroad régime, as it was in actuality afterwards. However, while Mr. Shonts was chairman of the Isthmian Commission, he consulted directly with the President on all matters pertaining to the Canal. Indeed, the Secretary of War began his famous trip to the Philippines simultaneously with Mr. Shonts' taking charge at Panama.

On the unexpected resignation of John F. Wallace as chief engineer, in June, John F. Stevens was selected by Mr. Shonts for the vacant position. Mr. Stevens had just resigned the vice-presidency of the Chicago, Rock Island, & Pacific Railroad, by reason of the fact that he had made a contract with the Insular Bureau at Washington to go to the Philippines and supervise for the Government the construction of a thousand miles of railway, bids for the building of which were to be opened the following December. The Government was glad to release him from his Philippine engagement, in order that he might accept the position of higher responsibil ty at Panama. Mr. Stevens ranked then, as he does now, among the foremost civil engineers in the United States.

There is no one of his associates in the Canal Zone during the railroad régime, who will not to-day talk about John F. Stevens by the hour—given the opportunity. His previous professional achievements were known to every engineer on the Isthmus, from the heads of divisions to the tyros just out of college, and he immediately demonstrated his capacity there by devising

the spoil-removal system, which Colonel Goethals declared no Army engineer would have been capable of, whereby all tracks leading from the cut were so located that the excavated material moved on a down grade to its final disposition. Under the personal direction of the Chairman of the Commission, Mr. Stevens, as chief engineer, was in charge of the important department of engineering and construction. He was a man of serenity and calm, who never hurried and was always ahead of his work, qualities that captured the fancy of the workers under him, skilled and unskilled. It was his personality that inspired the industrial army at Panama with the enthusiasm that Colonel Goethals was so fortunately able to retain in it, and which has made it the best working force ever got together in a tropical country. It was Mr. Stevens who began the practice that Colonel Goethals has wisely continued, of allowing access to him of the humblest laborer who had, or thought he had, a grievance. It was Mr. Stevens also who showed how to deal with a strike on the Isthmus, using the arbitrary power of the United States Government in the Canal Zone to deport those

steam-shovel engineers who, in 1906, attempted to take undue advantage of the labor situation.

Upon the resignation of Mr. Shonts as Chairman of the Isthmian Commission, Mr. Stevens was appointed to succeed him, while he still held the position of chief engineer. However, he resigned both offices after a short time for reasons best known to himself, having during the two years of his administration demonstrated beyond question that the successful construction of the Canal was an assured fact. There are engineers living to-day who believe that Mr. Stevens' resignation cost the United States Government millions of dollars. When Mr. Stevens resigned from the Isthmian Commission, he was given a "send-off" at Panama such as few men have ever received from others employed under them, the skilled workers on the Canal uniting in a testimonial that included an album containing 10,000 signatures.[1]

In an address before an audience of engineers in Chicago last winter, Lorenzo D. Cornish, who worked on the Canal as designing engineer under both Mr. Stevens and Colonel Goethals,

[1] See Appendix, page 358, "Farewell to Mr. Stevens."

de Vos, Chicago

John F. Stevens,
Chief Engineer of the Panama Canal, 1905-1907

UNIV. OF MICH.

paid a tribute to the chief engineer during the railroad régime at Panama, that is the more valuable in that it was a disinterested testimonial at a period when the fashion was to render praise only to his successor. "Much has been said of the loyalty and *esprit de corps* shown by the men of the organization on the Isthmus, and to the speaker none of the achievements of John F. Stevens was of greater value to the work as a whole than that of having engendered so deeply in his men that spirit of pride and loyalty to himself and the work that it has endured and grown, until now loyalty to the job comes first in the hearts of every Canal employé," said Mr. Cornish. "The love of his men for John F. Stevens is past understanding, and the greatest regret of hundreds of the old-timers on the Canal is that he has never returned there to give them the opportunity of welcoming him by an ovation never yet accorded to any other personage."

On leaving the Canal organization Mr. Stevens was made vice-president in charge of operation and maintenance of the New Haven railway lines, and subsequently president of a railroad

he had constructed in Oregon. He is at present one of the most successful consulting engineers in the country, with offices in New York.

It was a propitious outcome of his acquaintance among railroad officials that Mr. Shonts was able to put his hands upon men especially fitted to become heads of the various departments of the Canal work. It was not a gilt-edged proposition he had to offer them, however. The salaries the Government would pay were smaller than those most of the men whose services he desired were already receiving; the positions were none of them permanent, since they would terminate with the completion of the Canal, and there was the imminent risk of disease and death to be encountered in the Canal Zone. However, the same patriotic impulse that moved Mr. Shonts and Mr. Stevens to ally themselves with the national enterprise at a material sacrifice, enabled the Chairman of the Isthmian Commission to bring together a notable body of railroad men at Panama. Mr. Stevens' first assistant was John G. Sullivan, who, with George D. Brooke, a recruit from the Chicago, Rock Island, & Pacific Railroad, and

superintendent of motive power and machinery and the Culebra Division of the Canal, devised what is known as the "side extension" for the cars—used on the trains that were unloaded by the Lidgerwood unloader, which prevented the spoil trains from being stalled in their own debris and enormously expedited the work of excavation. Mr. Sullivan is now chief engineer of the Canadian Pacific Railroad.

David W. Ross, who had been purchasing agent and afterward superintendent of transportation of the Illinois Central Railroad, left the latter position to become head of the Canal's purchasing department, and is at present vice-president of the Interborough Rapid Transit Company of New York.

Edward J. Williams, paymaster of the Chicago & Northwestern Railroad, became disbursing officer on the Isthmus and held the position until the practical completion of the Canal in 1913. He is now treasurer of the McCord Company of Chicago, one of the largest dealers in railway supplies in the United States.

From the Chicago, Rock Island & Pacific road, where he was assistant general manager, came

William Grant Bierd, to take charge as general superintendent of the operation of the Panama Railroad. It was Mr. Bierd who invented the track-shifter—now in use throughout the world in railroad construction where "filling in" is necessary—which saved the expenditure of some $8,000,000 in the construction of the Panama Canal, and increased the output of the steam-shovel battery at least fifty per cent. The speed with which a steam-shovel can work is measured by the rapidity with which the spoil trains are unloaded. The disposition of the spoil at the dumps requires the constant shifting of the tracks, which, previous to Mr. Bierd's invention, was done by hand by labor gangs, while the trains waited, and the steam-shovels waited for the trains' units, the cars. It would have required fully 4000 additional laborers daily to do the track-shifting on the Canal for the seven years that the mechanical track-shifter was in use, and their wages alone would have amounted to more than the amount I have mentioned as saved by Mr. Bierd's invention. Mr. Bierd to-day is President of the Chicago & Alton Railroad.

The Oregon Railway and Navigation Company, a part of the Harriman system, contributed its general auditor, Ernest S. Benson, to the Canal organization, where he assumed control of the accounting department. Walter G. Tubby, for years general storekeeper of the Great Northern Railroad, left that position to perform the same duties at Panama. He has recently gone into business in San Francisco, after having for several years held the position of manager of the marine department of the Union Oil Company of California. The late Jackson Smith, whose death occurred soon after he left the Canal Zone in 1908, had had a very extensive experience as railroad contractor and in other capacities with construction labor, and he took charge of the department of labor and quarters.

Joseph G. Holcombe, who at the time Mr. Shonts was recruiting his captains for Panama had just returned from the Philippines was then executing an engineering commission for a firm of railroad contractors, and who had previously done work for the Government at Nicaragua, was made head of the division of municipal

engineering in the Canal Zone, carrying through and bringing to completion the work initiated in 1904, as well as all engineering operations connected with the work of sanitation of the Isthmus. He is now practicing his profession as civil engineer in New York. Richard Reid Rogers, a specialist in railroad law, practicing in New York, was made general counsel to the Isthmus Commission and the Panama Railroad; he still holds the latter position, and is also general counsel to the Interborough Rapid Transit Company of New York.

Three other engineer appointees of Mr. Shonts, who worked on the Canal until its completion, are responsible for the greatest mechanical achievement in connection with the big ditch. They are Lorenzo D. Cornish of Chicago, who designed and supervised the construction of the lock chambers; Henry Goldmark of New York, who designed and supervised the construction of the miter gates for the locks, and Edward Schildauer of Wisconsin, who designed and supervised the construction and installation of the machinery for the operation of the gates and the towing of the vessels through the locks.

Some of our national legislators made strenuous objection to the $10,000 per annum salaries paid to the heads of departments at Panama under the railroad régime, as well as to the $30,000 salaries paid to the chairman and the chief engineer. Senator Bacon, of Georgia, insisted that no Canal official ought to be paid more than a Chief Justice of the United States, whose salary was $15,000 a year—that of a Senator being $7,500. "Ten thousand dollars a year," complained Mr. Bacon, "is paid the auditor of Canal expenditures, and his work comes here for supervision and correction and approval by an auditor of the War Department, an officer who gets $4,000 per annum under the Government. The auditor of Canal expenditures gets $10,000; the Secretary of War at the head of all this business gets $8,000." Senator Bacon and the others of his way of thinking were somewhat surprised when they learned that Mr. Wallace, whose salary as chief engineer of the Canal was $25,000 per year, was being paid $75,000 per year by the Westinghouse Company; they were enlightened as to what might constitute a man's value to his employers

when Mr. Shonts, before a committee of the Senate, showed them how Mr. Ross, the purchasing agent of the Isthmian Commission at $10,000 per year, had saved the Government of the United States more than $240,000 in a few weeks in three purchases of material. The incident is thus reported in the *Congressional Record:*

MR. SHONTS. I will say that he (Mr. Ross) saved $193,000 in one purchase from the lowest bidder after he had the bids in and opened.

SENATOR TILLMAN. Will you explain that, please?

MR. SHONTS. He did that by pointing out to them where they were charging us more than they would for different items entering into the construction of the cars and engines that were concerned. The bidder himself—the lowest bidder—came down in his bid and saved the Government $193,000.

SENATOR HALE. Which you would have spent if simply taking the figures of the lowest bidder as they came in?

MR. SHONTS. That is it, exactly.

THE CHAIRMAN. In case an unskilled man had been purchasing agent?

SECRETARY TAFT. Yes, sir; in case an unskilled man had been purchasing agent.

MR. SHONTS. Or a skilled man, if he had not known all these items and the relation they should bear to each other. In three items, in three purchases, we have saved, according to an account I have kept, over $240,000.

Mr. Ross saved the country another three quarters of a million dollars—$751,124.61, to be exact—by introducing into his department the American railroad purchasing system, whereby a deduction of one tenth of one per cent. per day, as liquidated damages, is made on payment for material and supplies, delivery of which is delayed beyond a specified time.

Another conspicuously valuable investment on the part of the Government, in the services of a railroad man, concerns the achievement of Mr. Williams, disbursing agent of the Canal from November, 1905, to October, 1913, during which period he paid out $250,000,000—the largest sum ever expended in the same time, unless for the expenses of a government—without making an error. Mr. Williams saved the United States approximately $750,000 during his eight years with the Canal, on a salary of $10,000 per annum. At my request he has

written the following brief sketch of his successful essay in finance:

"I found in existence, on my arrival on the Isthmus, what was known as 'the bankers' agreement,' made by Secretary of War Taft, in which four banking houses in Panama City were concerned. This agreement required the disbursing officer of the Isthmian Commission to obtain all his money from these four firms, the Panama silver being taken at its par value of two for one in United States money, to be exchanged for drafts on the United States Sub-Treasury at New York, where my account was then kept, while for each dollar of United States money required for payment on the Canal, also to be obtained from these four banking firms, we were required to pay three quarters of one per cent. premium. During this year, from April 1, 1905, to April 1, 1906, this premium amounted to $24,409.95. Had the bankers' agreement been continued up to the present time, it would have cost the United States approximately $700,000, while at one per cent. it would have cost us more than a million dollars, while the gold rolls would have cost us $5,000 per month, or $60,000 per annum.

"I at once saw the disadvantage of this agree-

ment from the point of view of the United States, and did my best to prevent its renewal at the end of the year, when it was to expire. To my great surprise I found that the bankers had so worked on the fears of Mr. Taft that when they refused to entertain a renewal of the three quarters of one per cent. contract, he was considering its renewal with the premium increased to one per cent. on gold in United States money needed by the Isthmian Commission. I immediately placed the matter before Mr. Shonts, the chairman of the Commission, and explained to him that by ordering gold coin from the United States, to arrive at the expiration of the bankers' agreement, and by loading up on Panama silver in advance and using Panama silver only for the payment of claims in amounts of less than five dollars, I would soon have the bankers, who were ill-supplied with vault room to care for the silver, on their knees begging me to take the silver off their hands. After they had had their own troubles on this account they 'came across' and were ready to supply me with all their surplus funds, taking in exchange the disbursing officer's drafts on the Sub-Treasury at New York at par, thus removing absolutely every charge for the payment of the premium on all disbursements, money itself being delivered by them at their own expense to my

vaults in Panama. This arrangement is still in force. I might add that the Panama bankers also had a scheme to have the Panama silver retired and to use only United States gold. If they had succeeded in getting the new contracts they desired, they would have forced us to pay a premium on all disbursements."

With Mr. Williams reducing expenditures in the construction of the Canal by $750,000 in the disbursing department; Mr. Ross reducing them by approximately $1,000,000 in the purchasing department; and Mr. Bierd reducing them by $8,000,000 in the cost of excavation, it may be observed that the heads of departments on the Isthmus during the railroad régime at least paid their own salaries.

The fact has been mentioned that one of the first measures of Mr. Shonts after his appointment as Chairman of the Second Isthmian Commission was the creation of an organization in Washington, the Office of Administration, of which I was chief during the greater part of the railroad régime at Panama. Under the first Commission the Washington offices were located in cramped quarters in the *Evening Star* Build-

ing at Pennsylvania Avenue and Eleventh Street. The office organization was entirely inadequate, and the failure of Admiral Walker's administration was largely due to the fact that the headquarters in the United States did not meet promptly the demands that came from Panama for material, supplies, and men. It is a fact, as has been stated, that the members of the Canal organization on the Isthmus were without sufficient authority or funds to carry on their work, but even with authority conferred and funds in hand the Washington office proved an ineffective instrument in responding to demands from the Canal Zone. Therefore, with the coming in of the railroad men, whose policy was to centralize responsibility and work on the Isthmus, it was essential to have a competent force of men in Washington to act on instructions from Panama. In looking over the field from which officers experienced in such work might be recruited, Mr. Shonts naturally turned to the newly created Insular Bureau of the War Department, which had been developed as a result of our war with Spain. This Bureau was the home office of the governments of

Cuba, Porto Rico, and the Philippine Islands, charged with their representation in the various branches of the Government at Washington, and also with such duties as the shipment of materials and supplies, recruiting of their civil-service employés, and their fiscal affairs in general.

This being similar to the work to be done for Panama under the new policy, Mr. Shonts, after a conference with the President and the Secretary of War, made an arrangement whereby the chief and assistant chief (respectively Colonel Clarence R. Edwards and myself) of the Bureau of Insular Affairs should act in the same capacity for the new Office of Administration of the Canal, but this disposition of control proving unsatisfactory, Colonel Edwards devoted himself exclusively to the conduct of the Insular Affairs and I to those of Panama. We now took a long lease of a newly constructed eight-story office building opposite the State, War, and Navy building in Washington, and an adequate and efficient office force was organized. Here Mr. Ross, the purchasing agent, with his two assistants, C. E. Dole and Mansfred Fuhrer, and

Davis & Sanford, N. Y.

Theodore P. Shonts

Chairman of the Second ("The Railway Men's")
Canal Commission. 1905-1907

Mr. Benson, the auditor of the Commission, made their headquarters, and James G. Jester, who had been disbursing officer of the Bureau of Insular Affairs, was transferred in the same capacity to the Office of Administration of the Canal. The recruiting of the skilled labor for the Isthmus was placed in charge of an appointment division, of which Ray L. Smith was made chief; the voluminous records of Canal affairs were given into the hands of Henry Seymour, who had been assistant chief of records of the Insular Bureau, and Arthur L. Flint, who had been for many years chief clerk of the general staff of the army, took charge of the office correspondence. The organization and personnel of the Office of Administration in Washington remain to-day as established under the railroad régime, save for the fact that Mr. Ross, Mr. Benson, and myself resigned when the Third Isthmian Commission assumed control, and Mr. Jester on the advent of the permanent organization on April 1, 1914. I was succeeded as chief of the Office of Administration by Captain F. C. Bogge, who also assumed the title of general purchasing agent in succession to Mr.

Ross, although Mr. Ross's deputy, Mr. Dole, continues in that position. Mr. Benson's deputy under the railroad régime also still holds his position.

The jurisdiction of the Office of Administration of the Canal in Washington extended throughout the United States; branch purchasing and forwarding agencies were established in New York, New Orleans, San Francisco, and Seattle, and labor recruiting officers were given traveling commissions that took them from place to place as the contingencies of the service demanded.

CHAPTER IV

THE WALLACE AFFAIR

THE one unpleasant incident affecting the personnel of the railroad régime was the sudden and unlooked-for resignation at its beginning of Chief Engineer John F. Wallace. It was by mere chance that relations of the friendliest nature existed between Mr. Shonts and Mr. Wallace. The father of the chief engineer of the Canal, the Rev. Dr. David A. Wallace, a United Presbyterian clergyman, was the founder and president of Monmouth College, in Illinois, of which Mr. Shonts was an alumnus, his parents being members of the United Presbyterian denomination and friends of Dr. Wallace. John F. Wallace had left home while still a youth, and Mr. Shonts did not meet him until business relations brought them together later in life, when home recollections and traditions constituted a strong bond of amity between

them. Consequently, when Mr. Roosevelt, in discussing the composition of the new Isthmian Commission, had said: "If you can use Wallace, he's on the job," Mr. Shonts, knowing him to be one of the ablest engineers in the country, had warmly advocated his retention as chief engineer of the Canal and his being made a member of the Commission.

Mr. Wallace was at once cabled for to come to Washington, where he received instructions from Mr. Shonts as to the conduct of affairs on the Isthmus, pending the proposed visit of the Chairman of the Commission the latter part of June. He arrived early in April, just before the yellow-fever epidemic at Panama reached its height; and, although Mr. Shonts was anxious to have him return as soon as possible because of the demoralization that was growing among the Canal employés, Mr. Wallace asked permission to go to Chicago for two weeks on private business after his duties in Washington were completed. This permission was granted, and he finally sailed for Panama about the middle of May.

Mr. Wallace had been profuse in his thanks to

Mr. Shonts for retaining him as chief engineer and for approving his promotion to membership in the new administration of Canal affairs, nor could he say enough about the pleasure it would give him—as he expressed it—"to work under a broad-gauge man." Mr. Shonts went down to the ship to see Mr. Wallace off on his return to the Isthmus, and here also the departing traveler voiced fervently his sense of the obligation under which he declared he would always remain to the man he called his benefactor. "I have been living in a cave for a year, and now I am in the sun once more," was Mr. Wallace's expression of grateful relief.

Under these conditions the surprise of the Chairman of the Isthmian Commission may be imagined, when, on June 5th, the following cable message from Mr. Wallace at Panama was received by the Secretary of War:

"Important complicated business matters which cannot be arranged by correspondence and which may affect my relations as chief engineer of the Commission necessitate immediate return to the United States to confer with you and the others. An order from you to return for official

consultation will prevent apprehension on the part of employés. Suggest Shonts remain until my arrival. Please answer."

After a conference between Mr. Roosevelt, Mr. Taft, and Mr. Shonts, the chief of office of the Canal administration in Washington sent the following reply to the chief engineer's cable:

"Secretary of War and Shonts, in accordance with your request and without knowledge of circumstances that justify, approve your return for consultation with them at Washington."

Before Mr. Wallace reached Washington the President and Mr. Shonts speculated more than once as to what "complicated business" could possibly be important enough to warrant the chief engineer in leaving his post at perhaps the most critical period in the American history of the Canal, for yellow fever was still raging at Panama and his departure would tend to stampede the white employés, who even then were leaving the Isthmus by every steamer coming north. The following letter from Governor Magoon at Panama to the Secretary of War,

dated June 11th, let in some light on the situation:

"Mr. Wallace has had two conversations with me of such character that I feel obliged to communicate the substance to you. He says he has received an offer of employment in the States that affords him more pay and better opportunities than his present position. He is going to the States (as you have been advised by cable) to resign as chief engineer, to take effect September 1st, but is willing to remain as a member of the Commission. He further wishes to take a vacation until September 1st, and prepare his annual report at his home in Chicago, and not return to the Isthmus. 'Here ended the first lesson.'

"I was anxious, of course, to probe the matter further and ascertain if there were anything back of it, and therefore sought another interview the next day, told him of my anxiety as to the situation, and asked if there were anything in his relations with me, personal or official, or our relative standing, etc., that was objectionable. He said, 'No. The trouble lies in another direction'; and proceeded to object to the requirement that he should remain on the Isthmus except when given permission to leave; to receiving less salary than Shonts; and to

being placed in a position subordinate to the chairman, 'who was getting the credit of bossing the job.'

"It was plain, by this time, that there was something deeper yet, and so I asked him if any arrangement could be made that would satisfy him and induce him to remain, and he said 'there might be, but I don't know.' He went on to say that the only thing that would induce him to remain was to make him chairman; combine the two departments of which he and Shonts are the heads, and give him full power over all the work, complete and unrestricted; fix his salary at between $50,000 and $60,000, he to come to the Isthmus when he sees fit and depart as his discretion determines. The plan he has in mind is, that he is to be so completely vested with all authority that no one can doubt or question that the entire credit of the enterprise in all branches belongs to him. He said nothing as to his plan being the more efficient, but confined himself to statements that such was what he wanted.

"I asked him if he intended to talk to you as frankly and candidly as he did to me. He said he wrote you a letter last March, in which he told you what he wanted done, but his wishes were not carried out; that he made it a rule in dealing with his superiors to let them know

what he wanted and 'leave it to them.' He made a further statement, to which I attached grave significance—that he left the Illinois Central twice without telling them, directly, what he wanted, and was sent for and given three times as much as would have induced him to remain at the time he left.

"Evidently he considers himself essential to this enterprise, and, for the immediate present, he is. He has never secured an assistant engineer competent to take his place or keep the work going at a decent pace for sufficient time to enable a new chief engineer to master the situation. His department is not organized, *i. e.*, the machine is not built and therefore cannot run itself. I have urged him several times since we came here to appoint some big men in his department and put them at work on his organization; but he said it was difficult for him to secure the men he wanted. The data he has collected is scattered through his files and he said he could incorporate enough of it in his report to enable his successor to understand and utilize the substance of it all. I doubt it.

"Speaking of his desire to be the head of the enterprise, he told me that he figured from the first that Admiral Walker would not last more than two years and he had intended to have things in such shape by that time that he would

be made chairman; but the old Commission went to pieces too quickly for him. When to the present development are added numerous incidents occurring during the past two months, incidents that appeared to be trivial at the time but now appear important indices, I cannot escape the conviction that he is trying to 'pull off' a carefully contrived *coup d'état.* I think he expects to go, but to be recalled in the future. I hope I am doing him a grave injustice, for personally I like him and our relations have been very pleasant. I can readily understand that from his point of view the action and motive I attribute to him are entirely justifiable. In railroad circles, as on the stock exchange, it is entirely justifiable and even commendable to 'squeeze' friend or foe when you have the chance and can profit by it.

"That something like this is in his mind is indicated by his telling me when I urged him to have a full and free talk with you that he had thought of going to Shonts and 'putting it to him straight.' I am very sorry this complication has arisen on the eve of your departure for the Philippines. I had hoped to advise you before you started that everything here was in smooth sailing. It is of course unnecessary for me to say that I have urged upon him every argument I could muster to induce him to maintain the

status quo, at least until your return. I have written you thus fully that you may have a few days to turn the matter in your mind before the matter presses for determination.

"I have no objection to this letter being read by the President and Mr. Cromwell, but request that no one else be permitted to know of its existence."

This letter of Governor Magoon's was followed by another, dated two days later, which ran thus:

"I have had another talk with Wallace and am inclined to think I judged him too harshly in concluding that he was attempting to 'squeeze' you.

"He seems to be fully prepared to quit, but willing to remain upon terms that seem to him justifiable as compensation for the sacrifice he feels he would make in continuing in the public service. There is no difference in its effect on the public service, but there may be considerable difference between the two mental attitudes. You will, however, have opportunity to judge that matter for yourself."

Mr. Shonts went to New York to meet the boat on which Mr. Wallace came up from

Panama. The day before Mr. Wallace's arrival William Nelson Cromwell called upon the chairman of the Isthmian Commission at his hotel.

"Has Roosevelt or Taft told you what Wallace is coming up here for?" he asked.

"I don't believe they know," Mr. Shonts replied.

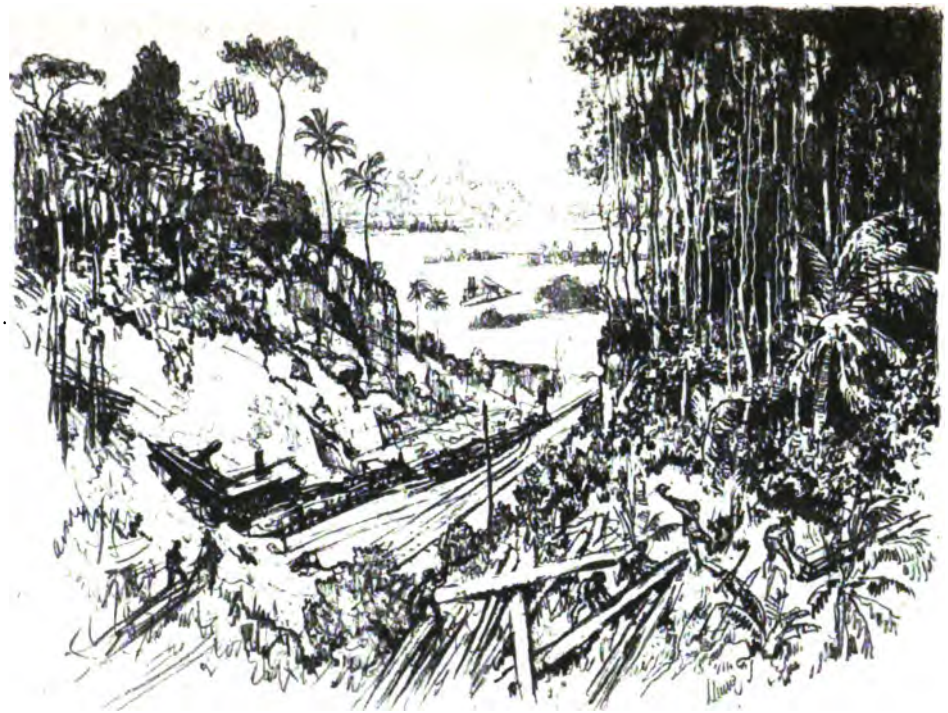
"They do know, and it's very decent of them not to tell you," said Mr. Cromwell. "They don't want you to know that he's coming up here to try to get your job, until after they've disposed of him. It seems that he took Magoon into his confidence in Panama and told him about a proposed *coup d'état*, and Magoon sent in the news before him."

It was on Thursday, the 22d of June, that Mr. Wallace arrived in New York from Panama, where he received a telegram from Washington requesting him to visit the Secretary of War at the Manhattan Hotel on the following Sunday. Mr. Cromwell was the only other person in the room during the meeting between Mr. Taft and Mr. Wallace, the Secretary having requested him to be present as a witness to their interview.

The conversation began with Mr. Taft's request that Mr. Wallace inform him what were the "complicated business matters" referred to in his cable of June 5th, that were of sufficient importance to warrant his leaving his post at Panama at so inopportune a time. In response Mr. Wallace told of the offer he had received from the Westinghouse Company, and explained in great detail why it was one he felt he could not afford to decline. He said that in the position he had in prospect he would be able to make money through investments in addition to his greatly increased salary; that the life on the Isthmus was lonely and accompanied by risk to himself and Mrs. Wallace; that his proposed new duties would not require all his attention for the next two months and he would close up the Canal work during that period, always provided that it did not take him to Panama again; and that, while he was severing his connection with the Canal organization, he was willing to make up his annual report, and would, if desired by the Government, continue to serve as a commissioner, but not as chief engineer in charge of the work of construction.

Mr. Taft made no immediate response to this suggestion, but questioned Mr. Wallace for half an hour as to the progress of the work on the Canal. If, however, the chief engineer expected that the Secretary would declare that he was indispensable to the construction of the big ditch and beg him to accept the chairmanship of the Isthmian Commission, he was disappointed.

"Mr. Wallace," said Mr. Taft, after the other had explained to him conditions in the Canal Zone, "I am inexpressibly disappointed, not only because you have taken this step, but because you seem so utterly insensible of the significance of your conduct. You come with the bald announcement that you quit your task at a critical moment, on the eve of important work, and in the midst of reorganization plans under which you accepted your position, with your department unperfected in organization, and when you know, too, that my public duties call me to the Philippines for several months. I must be allowed to remind you that when you were employed by the Commission a little over a year ago you were only receiving $15,000 per annum under your former position, and that



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The Jungle

your salary was fixed at the sum demanded by yourself, $25,000. That was for constant service on the Isthmus, where the construction work was to be performed and your services were required. You knew the risks to yourself and to your family, if they went with you, in the work you assumed an obligation to do. If you had not desired the position, you need not have sought nor accepted it, but I understand that quite the contrary was the case. I can refer more positively to recent events within my own knowledge. When the President found it necessary to make the reorganization of the former Commission, you were consulted in the frankest manner about every feature of the reorganization, and were encouraged freely to express your opinions. Indeed, your voluntary suggestions from the Isthmus embraced the proposal that you yourself be made a member of the Commission and chief engineer on the Isthmus.

"The substance of the plan of reorganization, as afterwards embodied in the President's executive order of April 1st, was cabled to you by me, and you cabled me your fullest approval of it

and your thanks, for it included the appointment of yourself as a Commissioner, as you had solicited, and as a member of the executive committee," Mr. Taft continued. "The new plan of organization was warmly accepted and indorsed by you when you arrived in Washington, and you expressed your hearty approval of it in the most unequivocal manner not only to the President and myself, but to members of the Commission and its counsel, and just before sailing for the Isthmus you called upon us and voluntarily thanked me in the warmest terms for what had been done in the reorganization of the Canal work and in the positions which had been given you. You coöperated for all these weeks in the work of reorganization and accepted the position assigned you under the President's order of April 1st. The President and myself relied upon this fact in making up the plans, and the other members were selected with that in view. Now, within twelve days after your arrival upon the Isthmus you send me a cable which, read in the light of what you say to-day, signifies your practical acceptance of an offer of another position inconsistent with the perfor-

mance of your duties on the Isthmus. I am astonished that you should be so disregardful of the splendid opportunities of the position, which would have made you famous the world over by the honorable performance of your duties of chief engineer.

"For mere lucre," the Secretary asserted with severity, "you change your position overnight without thought of the embarrassing position in which you place your government by this action, when the engineering forces on the Isthmus are left without a real head and your department is not perfected in organization; when the advisory board of engineers is to assemble under call of the President within two months, and when I am departing for the Philippines on public duty. All this you knew as well as I know it, but it has not had the least influence upon your action—you have thought of yourself and yourself alone. I consider that by every principle of honor and duty you were bound to treat the subject differently. You have permitted the President and all of us to proceed in full confidence that you would perform the functions of chief engineer, and now, in an

hour, you drop your great duties and throw them back upon us as if it were a matter of no consequence, and all this for personal advantage solely.

"Mr. Wallace," the Secretary said, "I do not agree with your idea of your rights nor with your idea as to your duties. I do not agree that the President's original order giving him the right to discharge an unfaithful Commissioner gave you the right to abandon your duties at a critical moment; but independent of that original order you accepted the duties of chief engineer on the Isthmus under the recent order of April 1st, which was made in coöperation with you and to suit your views. More than this, your duty in the premises is not measured by your mere legal contractual rights. It should be measured by the high obligation of a public officer with a sacred allegiance to the government it should be his honor and his pleasure to serve. You were, therefore, in honor bound, by all that has preceded, to continue to perform your duties upon the Isthmus until such time—a year at least—as would have afforded us reasonable opportunity to select a

competent successor and prepare him for the great duties of that office. You make not the least complaint against your associates, superior or inferior, I know of no possible ground for any. You are influenced solely by your personal advantage. Great fame attached to your office, but also equal responsibility, and now you desert them in an hour. Even from a standpoint of policy, you are making a profound mistake. If you could withdraw from your new arrangements, which I do not suggest, I could have no confidence—since I know now your conception of duty—that you would not in the future repeat the same act at a moment even more critical, when the consequences might be even more embarrassing and injurious to the Government.

"Under these circumstances, Mr. Wallace, and with great personal pain and disappointment," the Secretary of War concluded, "I am bound to say that I consider the public interest requires that you tender your resignation at this moment and turn over the records of your office to the chairman of the Commission."

Mr. Wallace replied that he had considered that he had a right to retire from the Canal

organization when he chose, and he added that he was desirous of talking the matter over and making some arrangement whereby the Government might use his services in some capacity.

"Mr. Wallace, further talk is useless," responded Mr. Taft. "It would be a dicker. I cannot dicker on such a grave subject. I have assumed that you have given this subject the greatest consideration, and you have approached it deliberately and stated to me your action in set and definite terms. You have unmistakably announced that you propose to accept a position so attractive that you could not possibly afford to decline it, and that you would not henceforth perform any duties for the Government as inconsistent with serving your new masters, who require your constant presence in New York, and, therefore, that you could not and would not go back to Panama as chief engineer."

"Mr. Secretary," said Mr. Wallace, "while there is a difference between us as to the point of view we take concerning my duty, I consider that there can be no question that I have performed my full duty up to this hour."

"Mr. Wallace," was the reply of the Secretary of War, "I do not consider that any man can divide such a duty up to any one point where it suits him to stop, and then claim that he has fulfilled his duty by merely performing it up to the point of his own selection. In my view a duty is an entirety, and is not fulfilled unless it is wholly fulfilled."

There was nothing further for Mr. Wallace to say, except that he would send his resignation to President Roosevelt at once, having done which he held out his hand to Mr. Taft, who avoided it.

"I would like to shake hands with you, to show that there is no personal ill-will between us," he said.

Mr. Taft now shook the other's hand. "Mr. Wallace," he declared, "I have no personal feeling against you at all. I sincerely wish that you may have every success in the new field that you are about to enter. I do not wish my position in this matter vindicated by any disastrous result to you, and I wish you well, but I am exceedingly sorry that you cannot see what a dreadful, dreadful mistake you are making. It pains me more than I can tell."

Mr. Wallace tendered his resignation to the President on Monday. It was accepted promptly. The same day the retiring chief engineer wrote to Mr. Shonts as follows:

"I desire to express to you my warm personal regard, and my thanks for the kind and generous way in which you have treated me in all matters connected with the work, and to assure you that your personality had nothing whatever to do with the step that I am taking: in fact, in considering the question from both sides, one of the strong inducements for me to remain was your pleasant personality and your warm personal friendship.

"On the other hand, the probability of your being disconnected with this work, either in the near or immediate future, which seemed to come to me intuitively, and the probability of the position being filled by some man with whom I could not harmoniously act, was one of the strong inducements that controlled me."

The reasons for Mr. Wallace's divorce from the Canal organization have always been made more or less of a mystery. As a matter of fact there was little of the mysterious about it.

There were several factors that urged him to leave against one inducing him to remain. He had been offered a salary of $75,000 per year—three times that which he received as chief engineer of the Canal—by the Westinghouse Company; the members of his family were in deadly fear of his contracting yellow fever and insisted that he should leave the Isthmus on that account alone; he had convinced himself after leaving Washington in May that he was entitled to control in Canal matters, and considering himself indispensable to the success of the project, believed that he might secure Mr. Shonts' place by using the Westinghouse offer as a lever, while in any event he was "fully prepared to quit" with the assurance of congenial employment at a big salary in the United States. A further reason for his resignation, advanced by Mr. Wallace sometime afterward, was that he feared the "all-pervasive influence" of Mr. Cromwell in Canal matters—although it was at his own suggestion that Mr. Cromwell's only direct connection with the Canal organization, as a member of the board of directors of the Panama Railroad, was brought about. The

possibility mentioned in Mr. Wallace's note to Mr. Shonts that in the event of the latter's disconnecting himself from the Canal work, the position of chairman of the Commission might be filled by someone with whom the chief engineer "could not harmoniously act," also had weight without doubt. As against these arguments for severing his relations with the Canal project, there was but one reason to stick to the job—a sense of public duty. No one is entitled to criticize too harshly Mr. Wallace's conduct, however, who has not been placed in a similar position himself.

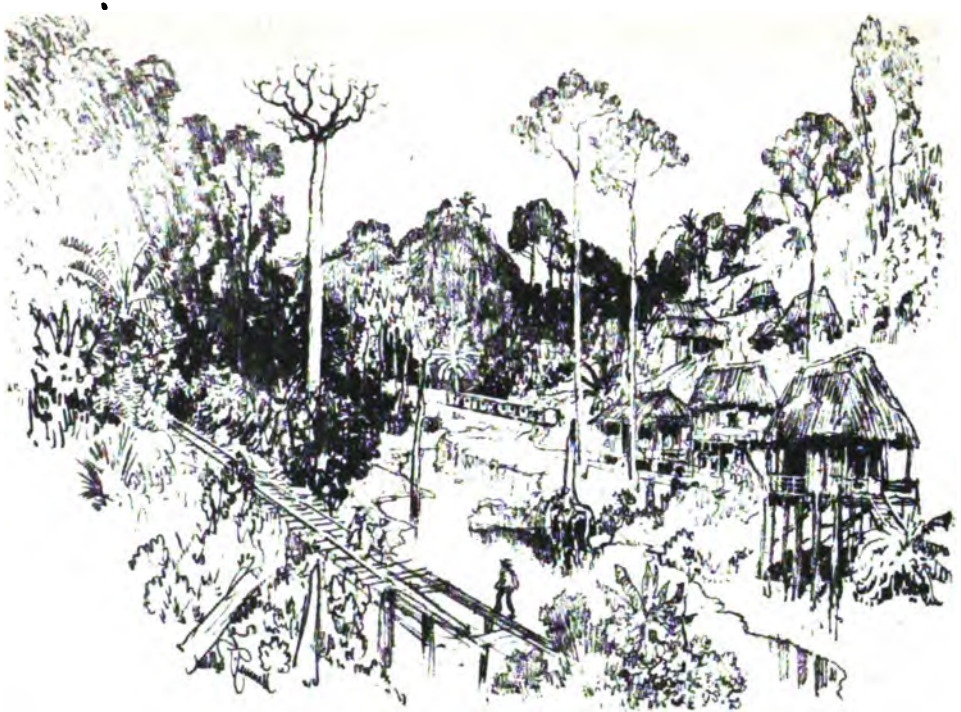
The work accomplished by Mr. Wallace while he was chief engineer was needed and used in the final plans for the Canal. The data gathered previous to his appointment, which were based on conjectures as to cost, rested on preconceived notions as to conditions that might exist, but had little real basis in fact. Mr. Wallace worked out and placed in operation a system of records that guided Mr. Stevens in making estimates as to the probable cost of the work. Mr. Wallace's work was of value that cannot be figured in dollars and cents, for on

what he did, and on records begun by him, the final cost of the Canal was largely based. Further, the surveys, together with the opposition he met from the Walker Commission, were a beacon light to the subsequent Isthmian Commissions and rendered material assistance in bringing about the adoption of the type of canal as now completed—although Mr. Wallace was an advocate of the so-called sea-level canal.

CHAPTER V

CREATING A MODERN STATE IN THE TROPICS

THE Chairman of the new Isthmian Commission arrived at Colon, on his first visit to the Isthmus, on July 26, 1905, and found that there were more passengers (principally Canal employés) booked to return on the steamer that brought him down than had sailed on her from New York. He was accompanied by Mr. Stevens and Mr. Ross, and the three spent their first day in the Canal Zone as guests of Governor Magoon, who had assumed office in May, and was living in a cottage in Ancon, pending the completion of a gubernatorial "palace" on which a hundred Canal employés were then at work. Mr. Magoon had conceived the perhaps, under other conditions, praiseworthy idea that his sojourn in Panama afforded an excellent opportunity to teach, by example, government to the Central and South American republics,



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Native Village

UNIVERSITY OF MICHIGAN

and he was making preparations for the inauguration in the Canal Zone of the several administrative departments as they existed in Washington, with a view to a secretary of state, an attorney general, a postmaster general, and the others, his thought being the enlightenment of those Latin-Americans who might visit the scene of Canal construction. Mr. Shonts had been made aware of Governor Magoon's proposed educational propaganda, as of nearly everything else that was going wrong in the Canal Zone, before his arrival. Nevertheless, things as he ascertained them to be during the first few hours after he reached the Isthmus were so much worse than he had anticipated as to rouse the ire of the veteran railroad builder, who had made concentration of effort and efficiency in the use of men and materials his first principles. However, Mr. Shonts did not begin to "talk business" until after dinner, when General, then Colonel, Gorgas having been summoned, the two, with Mr. Stevens, Mr. Ross, and Governor Magoon, held a conference on that official's porch, protected from mosquitoes by three thicknesses of wire netting.

"Governor, what's the matter down here?" Mr. Shonts inquired, abruptly, when cigars had been lighted.

Mr. Magoon replied that everything was the matter; that all the American employés who were able to get away had left the Isthmus by reason of yellow fever and because of doubt as to whether the Canal was really to be built; that those who remained had most of them left the United States originally for the United States' good; and that none of the employés were able to make enough to buy food.

"Why haven't their wages been raised then?" the Chairman asked.

"We have raised their wages twice," Mr. Magoon answered, "but each time the Panama merchants have raised the price of supplies."

"If that's the situation, we will have to sell supplies on our own account," responded Mr. Shonts.

"We can't do that," explained Governor Magoon, "because, under an executive order of the War Department, we are obliged to purchase our supplies from the Panama merchants."

"Nevertheless," repeated Mr. Shonts with

emphasis, "if the Panama merchants are taking advantage of the Canal employés in the manner you have stated, we will have to establish commissaries of our own."

"Mr. Chairman," said the Governor, "it will be impossible to establish commissaries to sell supplies, as you suggest, because it will be in violation of an order of the War Department."

Mr. Shonts refused to be impressed by the other's argument. He laid aside his official manner when he said:

"Judge, it's evident that you haven't heard the news."

"What is the news?" inquired Governor Magoon, with some perplexity.

"What do you suppose I've come down here for?" was Mr. Shonts' reply. "I've come down here to build the Canal and you'll excuse me for saying that if there is anything in that War Department order that is going to hinder or hamper us in building it, why, so much worse for the order."

Now he turned to the chief engineer. "Stevens," he said, "you take an engine and a car to-morrow morning, and load up all the food

supplies from our commissary in Colon; then go along the line and condemn a building where you can find one satisfactorily located, and plan to distribute these supplies to the Canal employés at cost. I am going to organize immediately for a permanent supply of food stuffs, which we will sell regularly to our men for what it costs us to have it delivered here."

"Why!" exclaimed Mr. Magoon, aghast, "you'll have every merchant in Panama up in protest."

"You just let your Panama friends protest all they want to," Mr. Shonts advised him. "When they begin, I'll give you something to do. You can listen to their protests and refer them to Washington, and I am willing to go to the mat with Congress whenever it is necessary, on this proposition—that we have a right to sell our own supplies to our own men.

"There's another thing, Mr. Magoon," the Chairman continued. "I see that you have a notion that one of your duties here is to build a model government for the edification of our southern neighbors. Now, I'm going to tell you something: That is not one of your duties

at all. We are not going to have any more government here than is absolutely necessary to preserve order. Our sole purpose on this Isthmus is to build the Canal, so 'keep your eye on the ball.' We are only going to do the things that are absolutely necessary to get the work done we came here to do."

Mr. Shonts now turned to General Gorgas and asked:

"Are you making progress in stamping out yellow fever?"

"No," said the General, despondently. "I'm not making much progress. In fact conditions are getting worse than ever."

"How are you going about the work?"

"We are disinfecting the houses in which patients die of the fever; sometimes the houses on both sides also."

"Have you done anything toward cleaning up the Isthmus?"

"No. You know that filth has nothing to do with the spread of yellow fever. It is transmitted only by the female of the stegomyia."

"Now, Dr. Gorgas," said Mr. Shonts, with some heat, "you heard what I just told Magoon

—that we are not down here to build model governments for educational purposes. We are not here to demonstrate any theories in medicine, either. I don't care whether filth has anything to do with this disease or not, but I come from the Middle West and we have a notion out there that cleanliness is next to godliness, and I believe that at times it may have some little effect on health. You are a soldier, and you know how to obey orders. How many men are there in your department?"

"About 200," replied the General.

"We can't build the Canal until Panama is made a safe place for men to work in, and I am going to build up your force ahead of everything else," Mr. Shonts announced. "I am going to give you 2000 men in place of your 200 to start with, and will increase the number to 3000 or 4000 if that becomes necessary. I don't care how many are required, or how much it costs, but this Isthmus is going to be cleaned up as quick as God will let us do it. Now, I want you to begin to disinfect, not only the houses in which yellow fever patients die—and when you are liberal, the houses on each side,—but I want

you to commence with the Palace in Panama and disinfect every house in that city and in Colon down to the lowest hovel. And when you get through begin at the Palace again, and repeat the process until I tell you to stop. I want you to clean out every cesspool on the Isthmus and fill them up, and take the rain water barrels away from the houses. We are going to build a chain of reservoirs and connect them up, and put in modern sewers, and we are going to pave the streets of Colon and Panama. And just because we own the old French administration building in Panama is no reason why we should occupy it as an administration building. The headquarters of this Commission is going to be on the line of the work along the route of the Canal.

"Colonel Gorgas," the Chairman continued, returning to the original topic of his conversation with the head of the sanitary department, "I understand that yellow fever may be wiped out by the destruction of one generation of the stegomyia mosquito. What is the life of the stegomyia?"

"From three to four months—four months is the outside limit," the chief sanitarian replied.

"Very well," Mr. Shonts responded, "I notify you now that by the time the present generation of the stegomyia die, yellow fever must be stamped out on the Isthmus of Panama. Make your requisitions for whatever you require at once. They will go to Washington by cable, and your materials sent here by the first steamer leaving New York for the Isthmus after their purchase. Don't consult me as to the stuff you need; that's your end of the business. And don't consider expense. Any requisitions you make as chief sanitary officer will be honored immediately and without question."

Before he retired that night Mr. Shonts issued orders for a meeting of the heads of departments in the Canal organization, in the chief engineer's office in Panama, at two o'clock the next afternoon. Information that this meeting had been called spread throughout the Canal Zone, accompanied by a rumor that it was to be the occasion for announcing the abandonment of the Canal project.

To the surprise of the onlookers before the chief engineer's office the next day, the men who came into the street when the meeting was over,

instead of wearing doleful faces and shaking despondent heads, were clapping one another on the back and shaking hands. A thrill traversed the Isthmus. The news was that the Canal was a liver proposition than ever; that the new head of the Commission, with full powers guaranteed to him by the President of the United States, had pledged himself to a business administration of Canal affairs with politics and red tape eliminated, and that the sanitation of the Canal Zone and the welfare of the employés were to be the initial features of the new program.

There was, however, one point in the address delivered to the heads of departments in the chief engineer's office that they did not talk much about, except among themselves; that point was team work. The new Chairman of the Commission had laid considerable stress upon the urgent necessity for all members of the Canal organization to pull together, and his intimation that the room of those unable to comprehend that necessity would be preferable to their company in the Canal Zone did not fail to have effect.

Mr. Shonts devoted a week to familiarizing

himself, so far as was possible in that limited time, with the situation on the Isthmus before beginning actual activities, the primary task of the railroad men, as has been stated, was to create a modern state in a ten by fifty mile stretch of tropical wilderness, scourged by deadly fevers and pestilence, and practically uninhabitable by natives of other climes. The magnitude of this task did not diminish on intimacy with its details. Before the Canal Zone could be made a place fit to live and work in, three hitherto insoluble problems had to be solved—that of the thorough sanitation of the Isthmus; of suitable habitations for all classes of employés, from heads of departments to negro laborers; of a food supply that would afford to all the workers opportunity to obtain fresh meat and vegetables at reasonable cost.

Perhaps the most pleased member of the Canal organization over the inauguration of the new and vigorous administration of the affairs of the Zone was the chief sanitary officer. General Gorgas, as has been mentioned, had been on the Isthmus a year when the railroad men arrived. He had been present in Cuba in 1900

when the experiments were made that proved the stegomyia mosquito to be the only medium for the transmission of yellow fever, and he had himself rid Havana of the dread disease in 1901, but the Army and Navy Commission had refused to allow him the sinews of war for the fight on the mosquito at Panama. As the result of the instructions given by Mr. Shonts to General Gorgas on the night of the Chairman's arrival in Colon, the sanitation machinery on the Isthmus was set in motion. While malaria and Chagres fever were venomous ills at Panama, yellow fever was the paramount obstacle to the construction of the Canal.

Under the direction of General Gorgas 3500 men were put to work on sanitation. Panama, Colon, and the towns, villages, and labor camps in the Canal Zone were fumigated over and over again, at first house by house, to stop the spread of the disease, and afterward as units, one city, village, or camp at a time. In June, 1905, there were 62 cases of yellow fever on the Isthmus; in July 42; in August 27; in September 7; in October, the worst month of the year for the disease, 5; in November 3, and in December 1.

Since December, 1905, there has been no case of yellow fever in the Canal Zone that originated there. There have been a few sporadic cases on the Isthmus since that time, but only where the disease was brought in from the outside, and in every instance the patient has been segregated and there has been no infection. The method of fumigating was to give the occupants of a house a few days' notice, when a brigade of sanitary workers in charge of an inspector would appear on the scene. The house would be made as nearly smoke-proof as possible, all cracks and openings in the structure being sealed with strips or sheets of paper, attached with paste. Iron pots on brick supports containing pyrethrum powder or sulphur were placed in each room, ignited, and left to smolder from two to four hours. The doors and windows were then opened, and as soon as the smoke cleared sufficiently for the laborers to remain in the house the floors were swept, and the sweepings, containing the dead and dying mosquitoes, were carried into the street and burned. All paper pasted upon the house was then removed, and it was usually left in a much

cleaner condition than before the fumigation took place.

The people of Panama, themselves immune to yellow fever, submitted patiently and uncomplainingly to the annoyance and inconvenience of these sanitation operations, but the fact that there were outbreaks of bubonic plague at La Boca in June and August—which were promptly stamped out in the initial stages—had something to do with their accepting the situation calmly. The diplomacy of Mr. Magoon, who, as Governor of the Canal Zone, was looked upon by the Panamanians as the embodiment of the power of the United States, had considerable influence in inducing the people to put up with what many of them considered to be a foolish and useless, as well as an annoying, proceeding. Big of stature and imposing in manner, Governor Magoon was just the man to impress the somewhat simple natives of the Isthmus, and their respect for him and his office was of no slight value in the reconstruction of conditions in the Canal Zone, other than in the work of sanitation.

Illustrative of the persistence and care with

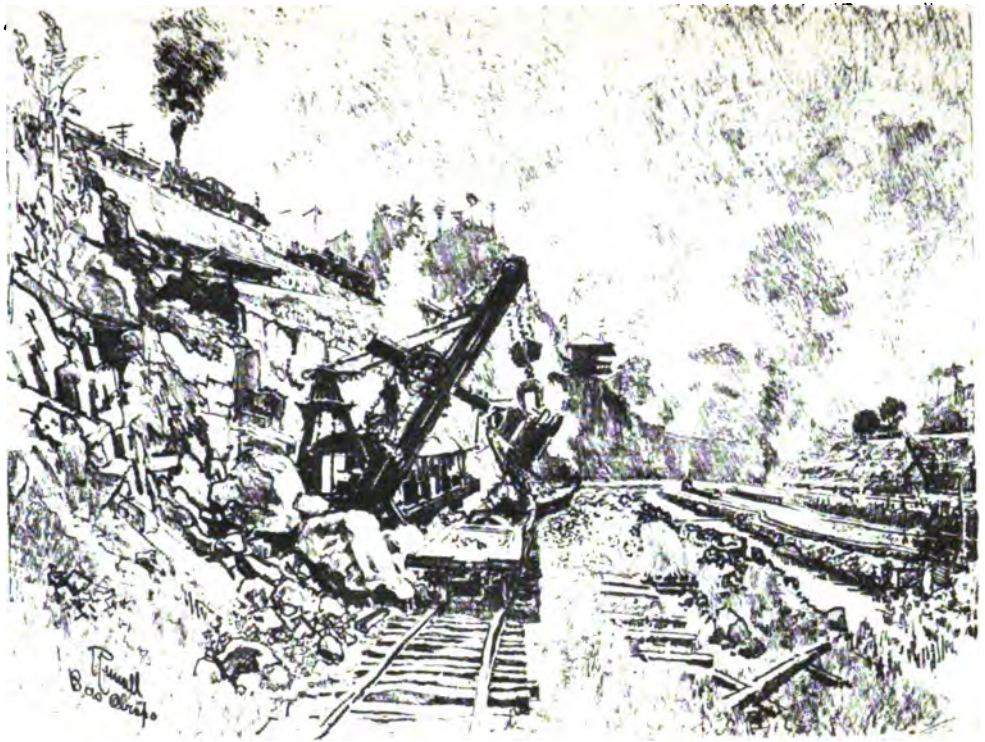
which Yellow Jack was followed up on the Isthmus; new foci of infection discovered, and the disease stamped out before it assumed serious proportions, the following extract from the 1905 report of the Commission seems worth reproducing:

" Whenever a fever case is reported, the house in which it occurred is immediately fumigated, as is the adjacent property. In addition to this, every effort is made to trace the movements of the patient during the days immediately preceding the contraction of the disease, and if it seems probable that he became infected in any other house or building it is also fumigated. This work of tracing the previous movements of patients in order to discover the centers of infection is often hampered by extraordinary difficulties, in overcoming which much ingenuity has been displayed. In one instance a man was reported ill at a hotel where he was registered. When search was made for him he had disappeared. The next day he was found drunk on the street and sent to the hospital, where, after his case had been diagnosed as yellow fever, he became delirious and died. He had stated that he had been at the hotel all the time, but there it became evident that he had contracted

the fever elsewhere. The man was dead, nobody knew him, and apparently no information was obtainable. It was known, however, that other men of the same nationality as the deceased were in the habit of visiting a certain café. Everyone of his countrymen in this establishment was questioned. At last a man was found who stated that he had seen him with an Italian. Then every Italian who could be found in town was interviewed, and finally one was discovered who said he had seen the deceased with the bartender of the theatre on two occasions. The bartender was looked for and could not be found. After a hard search he was located the following day. He was in bed and had yellow fever. He stated that the man who died of yellow fever, although registered at the hotel, had been sleeping all the time in the same room as himself in the theatre. It appeared probable that the theatre had been the center of infection, and it was accordingly fumigated. A few days later a third case was discovered, that of a little girl, who had been in the theatre every evening with her mother, thus confirming the indications which had already been acted upon. No other cases appeared."

Having banished yellow fever from Panama, General Gorgas devoted his entire energies to

the restriction of the ravages of malaria, since its abolition was impossible with seventy-five per cent. of the population of the Canal Zone carrying the germs of the disease in their systems, and the ten-by-fifty-mile area of territory breeding the anopheles mosquito in every part. He was so successful that before the railroad régime on the Isthmus was ended mosquitoes were so nearly exterminated along the line of the proposed Canal that during the dry season their number was negligible. During the rainy season, however, it was more difficult to keep the anopheles under control, for they reappeared as soon as efforts for their suppression were relaxed, and the fact was established that the cost of keeping them down would be a permanent annual expenditure. The 1907 report of the Isthmian Commission shows that up to the time the railroad men left the Isthmus the sanitation department had cut 16,000,000 square yards of brush; filled and drained 1,000,000 square yards of swamp land; burned 30,000,000 square yards of grass; dug 217,000 linear feet of ditches; laid 50,000 feet of tile ditches, and cemented 50,000 linear feet of ground. For a



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The Cut at Bas Obispo

distance of 200 yards around all settlements, marshes and swamps were drained, stagnant pools were oiled regularly to kill mosquito larvæ, and the doors and windows of all buildings in the Canal Zone were screened.

The work of the Sanitary Department under General Gorgas' able direction, which resulted in the extermination of yellow fever and a material reduction in the extent of malaria, comprised the necessary medical work, including the operation of hospitals, quarantine, and like measures, and the direction of a sanitary brigade charged with the duties of fumigation, cleaning of buildings and streets, and the elimination of localities for mosquito breeding. The other branch of the sanitation work, the municipal engineering construction, was carried on, under the direction of the successive chief engineers of the Canal, by an engineering division which had charge of the construction of aqueducts, sewers, roads, and pavements, while the sanitary engineering construction within buildings—that is, the installation of plumbing, previously unknown on the Isthmus—was carried on by the department of buildings, also under the direction of

the chief engineer. The two branches of work were entirely distinct, and, while the Sanitary Department could not have attained its final success without the installation of modern water supplies and sewers and the construction of paved streets and storm-water sewers, which prevented the collection of stagnant water, it should not be credited with the conception or direction of this work, which was planned by the First Isthmian Commission and carried on by the railroad men as part of the engineering construction in accordance with specific arrangements contained in the treaty between the Republic of Panama and the United States.

The erection of living quarters for the employés and supplying them with good food and pure water was accomplished during the same period that the sanitation of the Canal Zone was carried on. Employés of every grade, white and black, were given, free of rent, with free light and fuel, comfortable furnished houses. While many hundreds of these houses, of various classes and capacities, were taken over from the French, all of them had to be rebuilt and made sanitary, and in addition new dwelling houses

and living quarters, hotels, restaurants, clubhouses, schoolhouses, courthouses, post offices, jails, commissary buildings, fire-engine houses, shops, and railway buildings had to be provided.

Never in the history of the world has any government or any corporation made such comprehensive and exhaustive arrangements for the health and comfort of its common laborers as did the United States on the Isthmus in 1905 and 1906, and nowhere else on earth have rules of sanitation been so rigidly enforced, with such successful results. And in addition to all else, the railroad men established a system of government for the preservation of law and order with the result that, notwithstanding the fact that the Canal Zone contained a mixed population drawn from all quarters of the earth, serious crime was unknown, and arrests were mainly for petty offenses and violations of the sanitary laws. Aside from courts, schools, and places of religious worship, the Commission established such other essential appurtenances of civilization as bakeries and steam laundries.

Jackson Smith, head of the Department of Labor and Quarters, was, for a considerable period

during the railroad régime, the most unpopular man on the Isthmus among the white workers, this circumstance being due to his solution of the housing problem, whereby he became known as "Square Foot" Smith, a sobriquet that stuck to him during the five years he was at Panama. When Mr. Smith took charge of his Department, the assignment of quarters to the Canal employés was based upon influence or favoritism, which resulted in friction and jealousies. He decided to re-allot the houseroom completely, basing the amount of room given each man upon a ratio of one square foot of floor space to each dollar of his annual salary. Aware that this plan would arouse opposition, he submitted it to the chief engineer and to the Governor of the Canal Zone, both of whom approved it. Notices were then posted that on certain days certain houses would be evacuated by certain tenants and taken possession of by certain others; and, as this proceeding would naturally dispossess most of the favorites, a wail of consternation was heard across the Isthmus. The cable companies are the richer to-day by reason of the protests transmitted by wire to senators and

representatives in Washington on this occasion. However, "Square Foot" Smith gave no heed to opposition, and on the dates fixed the Department of Labor and Quarters carried out the plan for re-assignment, with squads of negroes in charge of American foremen, using force where force was necessary. From every source influence was brought to bear upon Mr. Smith to revoke his order and restore the favorites to their larger quarters, but without avail, and eventually the term "Square Foot" before his cognomen became one of respect rather than derision, for once in operation his housing plan worked perfectly and everyone recognized its equity.

"Square Foot" Smith never made a concession to anyone, no matter what his rank or position might be, with regard to the assignment of quarters. The story is told that just before he left the Isthmus, where he remained for a year after the railroad régime ended, a member of the Third Commission came to him with the information that a particular friend of his (the commissioner's) had just been assigned to duty on the Canal.

"There is a nice house near mine," he went

on, "which is something larger than he is entitled to under the rule. I think you can overlook the rule in this instance and give him that house."

"Mr. Commissioner," responded Mr. Smith, "I am leaving the department of Labor and Quarters next Tuesday. Your friend would better not apply for that house before Wednesday."

Another anecdote concerning Mr. Smith is told at the expense of a Member of Congress visiting the Isthmus, to whom the chief of Labor and Quarters had explained the square-foot theory of housing.

"I see," remarked the legislator. "Then if I were employed on the Canal I'd have 7500 feet of house room, based on my $7,500 salary."

"Scarcely," replied Mr. Smith, dryly, "I'm afraid they wouldn't pay you as much as $7,500 a year down here."

To create in the Canal Zone that essential of a modern state, a financial system, was the task of Mr. Williams, who has told in a previous chapter, how, by terminating the so-called "bankers' agreement," made by Secretary Taft with Panama bankers, and importing gold direct from

the United States, the Government was saved something like $750,000 during the eight years he was disbursing officer on the Isthmus.

Mr. Williams was one of the busiest men of the Canal organization. In March, 1906, he received a cable dispatch from Mr. Shonts, who was then in Washington, instructing him to take over the office of local auditor in addition to his duties as disbursing officer. These duties Mr. Williams continued until October, when another local auditor was appointed and a small part of the duties of the previous holder of the position assigned to him, while Mr. Williams was left most of the duties of the local auditor and all of those of the disbursing officer and treasurer of the Canal Zone. Later other duties of the local auditor were transferred to Mr. Williams, until he was in charge of all the general books of the Commission, classification of expenditures, property accountability and time and other inspections, in addition to the onerous responsibilities of disbursing officer and treasurer.

The expenditures made by Mr. Williams from the accession of the Second Isthmian Commission up to the end of the fiscal year, 1913, when

he left, by years, are as follows: For the fiscal year 1905, $6,070,320.02; 1906, $15,502,682.12; 1907, $26,012,594.13; 1908, $26,719,965.22; 1909, $28,352,528.26; 1910, $29,433,567.15; 1911, $29,673,032.99; 1912, $31,812,016.14; a total of $193,576,706.03, an average of approximately $24,000,000 annually.

This whole amount was paid by the importation of about $6,000,000 in gold. The money was paid out to the employés as wages and for supplies, and in a short time—three to four days—found its way back to the disbursing officer through the bankers and the post office money-order department, when it would be used again. Some of it was bound to get into other channels so that the supply had to be renewed from time to time. Great quantities of American money were carried off into the surrounding small republics because it had a staple value; but, although their money was very cumbersome, it was with great difficulty that we were able to introduce the gold from the United States at first. This was finally accomplished by calling our five-dollar gold piece the American pound. As it was worth forty cents in silver more than

the English pound, it soon became very popular. With this as a wedge we were soon able to bring about the general use of our money down to the nickel. After the tramways were started in Panama the nickel was used quite generally. Our one-cent pieces are still very little used. Panama silver was cumbersome, each thousand dollars weighing about fifty-five pounds, so that when the pay train was loaded up to go over the line, the weight of silver needed to meet the payments for a day would be about forty tons.

At times Mr. Williams was forced to make payments at some remote spots. For instance up the Chagres River, the Commission maintained stations where the velocity of the river's current was being measured and the trips to pay the men were made by clerks who endured great hardships and had many adventures. One of the most striking of these adventures was encountered by a French pay-clerk named Page, who had performed the same service through the occupancy of both French canal companies. In shooting some rapids, miles from human assistance, his boat was overturned and got away from him, the money he had in charge

going overboard. After he had recovered the money from the bottom of the river, he was forced to wade the stream for three days, for the jungle was so thick on either side that it was impossible for him to make his way through.

During their first eighteen months on the Isthmus, the Second Commission, with the sanction of Chairman Shonts, spent $30,000,000 on the construction of the Canal, of which about $5,000,000 was for government and sanitation; $7,000,000 for construction of living quarters and other buildings, docks, wharves, railway enlargement, waterworks, and sewers; $12,000,000 for the permanent plant; $4,500,000 in materials and supplies, and more than $1,500,000 in sewers, waterworks, and paving in the Cities of Panama and Colon. The purchases by the Commission included not only the material entering into the permanent plant, but also that required for the preliminary work, and an idea of their magnitude may be gathered from the following principal items: 61 steam-shovels, 1300 flat cars, 12 rapid unloaders, 22 unloading plows, 13 earth spreaders, 324 dump cars, 12 hoisting machines, 120 locomotives, 5000 tons

steel rail, 125,000 cross ties, 12,000 pieces of piling, 14 air compressing machines, 3 cranes, 152 rock drills, 30,000,000 feet of lumber (approximately), 2 dipper dredges, 646,000 pounds blasting powder, 617,500 pounds of dynamite, 7,000,000 paving bricks, 3,500,000 building bricks, 500,000 square feet roofing tile, 36,000 barrels of cement (approximately), 3 steel water tanks and towers, 12 stand pipes, and 2 ocean steamships.

CHAPTER VI

SOLVING THE LABOR PROBLEM

AN anecdote related by a visitor to the Canal Zone early in 1906 gives negative expression to the American view of the West Indian negroes, who had been the mainstay of the French in the manual labor of canal digging, and remained the sole source of labor supply until after the railroad régime on the Isthmus began. This visitor was watching an ant-run, a four-inch-wide, insect-trampled, brown strip through the grass, near the bank of the Chagres River. Tens of thousands of ants were scurrying along this road, laden with bits of green leaves; they were staggering under their loads, pushing and helping one another, frantically energetic in making traffic move.

"Where do they all come from?" the visitor asked Division Engineer Holcombe.

The engineer looked at the ants and sighed

wearily. "They don't come from Jamaica, I know that," he said.

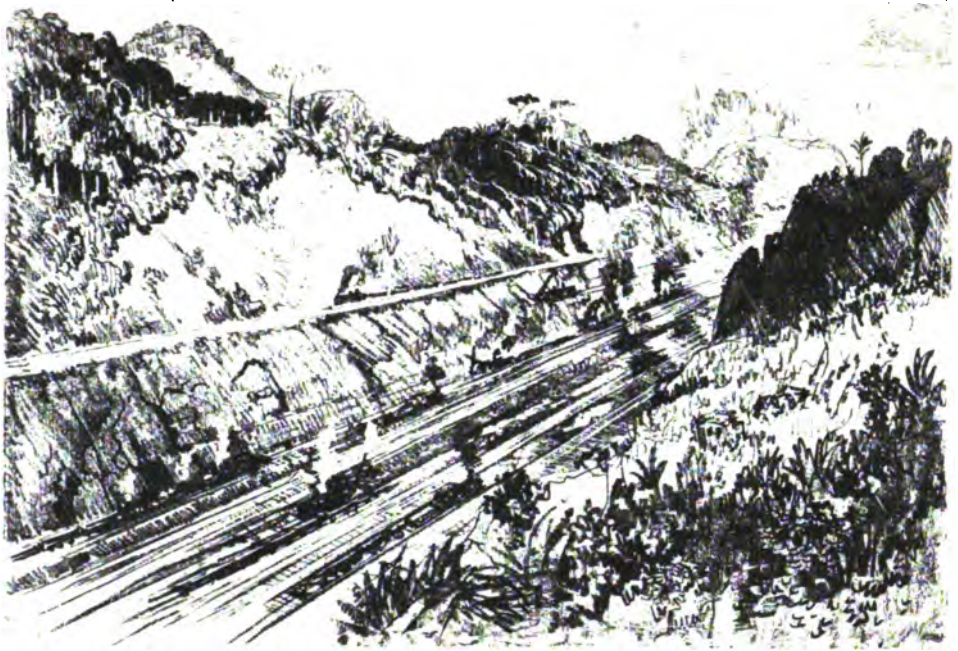
And it was upon the Jamaican negro and others like him that it seemed at first as if the United States would have to depend absolutely for the excavation of an amount of dirt and rock at Panama, that it had been estimated would be sufficient to cover the whole of Manhattan Island to a depth of twelve feet.

Tales of the laziness and incapacity of the West Indian negroes seem incredible. The only reason that they came to Panama to work at all was because they regarded the Canal as a get-rich-quick scheme, since they were paid four times as much for a day's labor as they could earn at home. The big wages brought negro school-teachers, barbers, shoemakers and dry goods clerks, as well as men who had never done anything else than manual labor—and very little of that—from Jamaica, Barbados, and others of the West Indian islands, all determined to do as little as possible for the money they received, aside from which circumstance they were constitutionally incapable of the performance of what would be considered a day's work in the

United States. The best that railroad contractors have ever been able to get out of a colored day laborer in the tropics is one third of what the average white man will accomplish in the Temperate Zone, but Mr. Dauchy, the Division engineer of the Culebra division of the Canal, estimated that the West Indian negroes under him did only one fifth of a white man's work per day. An American magazine writer epitomized the colored laborer at Panama in 1905, as having all the childish irresponsibility of the negro, all the procrastination of the Spaniard, and all the stolid self-sufficiency of the Briton—under whose rule he had been reared.

Mr. Shonts tells a story, illustrative of the congenital lassitude of the colored man and brother in the Canal Zone. A foreman of laborers sent one of his men to the upper deck to disengage some tackle used in the unloading of a steamer at Colon. This accomplished, work went on. Ten minutes later the foreman noticed the laborer recumbent on the upper deck, at the point where he had liberated the tackle.

"What are you doing there?" the foreman demanded.



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In the Cut at Las Cascadas

"You ordered me up here to fix that tackle, sah."

"Well, why didn't you come back when you got it fixed?"

"You didn't give me orders to come back," replied the black man in an injured tone.

Governor Magoon soon after taking up his residence in the Canal Zone had a posthole dug in front of his house in Ancon. The hole was four feet deep and two feet square, and the soil was not difficult of removal. It took four Jamaica negroes two days to dig that posthole. A foreman of painters told this story in 1905: "I had a job I wanted done in a hurry because the wife of a chum was coming down from the States and he wanted the place ready for her. I did the job myself. It took me a day and three quarters. Later I put seven Jamaica niggers on the house next door, exactly the same size; they were at it four days!" It was on record at Cristobal about the same time that two negro bricklayers with a helper, employed on "straight" work, laid an average of ninety-six bricks per day while building a wall. It took six negroes to carry an ordinary railroad

tie, and twenty-five of them to move an empty freight car on a level track.

The capacity of the black men of the West Indies for grandiloquent English was in inverse ratio to their ability as manual laborers, and they were very proud of their status as Britons.

"Don't you dare to expurge language of a blasphemous basis to me, I'm a British object," protested one Jamaican laborer to a foreman, who had taken him to task in words that were perhaps unjustifiably forceful.

Disbursing Officer Williams, who was continually traveling over the Isthmus in his pay car, relates many instances of dictional achievement among these West Indians.

"I expediated my departure because I was subjugated to unessential domestic inconvenience," an old Jamaican cook said to him, explaining why she had left her mistress.

A smart Barbados darky, who went home for the announced purpose of getting married, and returned to the Isthmus in a state of single blessedness, offered a sufficient excuse.

"I was prevented by circumstances over which self-control lays absolutely dormant," he said.

One day while Mr. Williams was making an inventory in an old French building at Ancon, he was warned by a West Indian carpenter against going too close to a wasp's nest under the rafters.

"Beware, sir," said the carpenter. "The wasp has a very warm bite."

On one occasion a negro ran along beside the pay-car that had left Gatun for Mindi and was gradually increasing its speed, when Mr. Williams asked him where he was going.

"I beg—to—inform you—sir," responded the wayfarer, gasping for breath in his effort to keep up with the train, "that—I am—going forward."

We cannot fail to sympathize with the Jamaican, who, picturing himself first as a spider and then as a grape, complains of conditions on the Panama Railroad, as follows:

"On the 13th of April of this Mounth and year I took the Train from Corozal. The Train was so compact that I could not even as a spider could sling on the step. I managed to hold a few chain But I have to let go on reaching Diablo. and then my hands begins to get tired. A Contract is an agreement between two or more

party to do and not to do a thing. I paid for the seven o'clock train to take me to panama and the train fail to took to panama. And there I have to walk my hat for three dollars and 75 cents was blown off my head, and one man pushed me and hit me on the head. Honorable sir then don't you think that a passenger should ride on the train without standing on the step. And as God is in Heaven do you take a coach and have to stand on the step, as for the whole truth there was not enough coach accommodation for passengers. Suppose a wreck came what would become of those men that hangs like grapes outside sir. I have related the matter to the station Agent at Corozal from saturday night. While I beg you for your answer."

The problem of labor for the construction of the Canal was almost the paramount one, that of the unskilled labor the most perplexing. Mr. Shonts and Mr. Stevens agreed that if the Canal was to be completed within any reasonable limit of time or expense, some other source for manual labor than the West Indies must be developed, not only to obtain a better grade and a surer supply, but to eliminate the sense of security the West Indian negroes possessed

in the assurance that they controlled the situation by virtue of a labor monopoly. There was no precedent for the assembling and caring for of the gigantic industrial army essential to the digging of the ditch across the Isthmus, and a field from which labor might be recruited without opposition did not exist. The United States was being developed in a vast and unending progression of great construction, mining, and agricultural enterprises that not only demanded all of our own labor, but was bringing workers from Europe at the rate of hundreds of thousands per year. The Southern cotton fields were demanding all of our own negro labor and more. Various complications rendered inadvisable the importation of Chinese or Japanese labor under contract, which was the only method that could have been applied in the use of that class of labor.

Under the rules of the Federal Civil Service, which governed the acquisition of the skilled labor for the Canal, absolutely unqualified men were sent down to take important positions at Panama. These incompetents were thus described by a magazine writer at

the beginning of the railroad régime on the Isthmus:

"The skilled laborers and the foremen immediately in charge of the laborers are men of sound sense, of somewhat adventurous spirit—of which their going down to the Isthmus is the best evidence—and of skill in their trades. But there is a set of men variously called 'superintending foremen' or 'superintendents' who are, for the most part, utterly incompetent. They apparently sought employment on the Isthmus because they were not worth their salt at home, where they were known. They are the laughing stock of the under-foremen and the skilled laborers and the despair of the engineers. When jacked up to make some sort of bluff at working, they moon around with an under-foreman, owlishly trying to learn from him the things in which they ought to be instructing him."

An anecdote of the Civil Service Commission of 1905, related by Mr. Cornish, the designer of the Canal locks, in an address before an audience of engineers in Chicago, last winter, probably seemed more amusing to him then than at the time the incident occurred. "In

the early days boiler-makers were badly needed, and a request for twenty was made in the regular way," said Mr. Cornish. "Some time elapsed, and the following cables passed between the Isthmus and Washington:

"'Why have you not sent boiler-makers, as per my cable?'

"The reply came: 'Forty applicants examined. All failed account of defective hearing.'

"Isthmus to Washington: 'Never knew of good boiler-makers that could hear. Send twenty of the deaf applicants as soon as possible.'"

At the beginning of the railroad régime at Panama the Civil Service Commission was holding examinations in different States for prospective Canal workers, and those applicants who made a satisfactory showing were sent to the Isthmus, and it was upon them that the mechanical, railroad, and engineering departments of the Canal organization had to depend for practical work. It was after Chief Engineer Stevens had received the second consignment of these Civil Service selections that he sent a cable to Washington: "I am not running a

training school to teach boys engineering and construction," the message read. "What I want is men who can go to work when they get here."

About this time eighteen men arrived on the Isthmus, who had been sent by the Civil Service Commission in response to a requisition for that number of track foremen. At the Culebra division they were examined by one of the resident engineers, who reported to the division engineer that he might possibly be able to use two of them. It turned out that only two of the eighteen had ever done any track work, and that had been done on the street railways in New York City. Sixteen of the "track-foremen" were returned on the same steamer by which they came, and the other two were retained as clerks in the medical department.

Civil Service methods of selecting labor, however wise in Governmental work, were entirely foreign to the railroad men's methods; but in my opinion the weakness in that method at that time was due to the fact that the right sort of skilled railroad laborers would not voluntarily submit themselves to the Civil

Service Commission for examination. It was at that time not a question of sifting out candidates by examination or otherwise, but of persuading the right sort of men to accept the employment; and it was necessary to go out and look for labor,—a proceeding not contemplated under Civil Service regulations. Therefore the United States Civil Service Commission, after many conferences with the writer, exempted the skilled labor on the Isthmus from the requirements of Civil Service examination, and vested the selection of that labor in the Office of Administration of the Canal. Unskilled labor on the Canal never was subject to Civil Service requirements.

The securing of more and better skilled workers was the first step taken, the Department of Labor and Quarters at Panama coöperating with the Office of Administration at Washington and sending recruiting agents throughout the country. Upon the receipt at the Office of Administration of a requisition indicating the number and kind of men with regard to vocation needed on the Isthmus, one of these special agents would open an application bureau where trade conditions

were calculated to bring together the sort of artisan required, and advertise big wages for workers on the Canal. The names of the men the agent selected would be sent to the appointment bureau of the Canal Commission's office in Washington, when they would be sent direct from their homes to the Isthmus, the Government paying all expenses from the port of departure.

It was not an easy matter to get good men to go to Panama, even with the advantage of a big wage and a month's vacation with pay each year. Ambitious young mechanics, who looked ahead, realized that the Canal job could only last a few years at most, and that the great majority of the workers would have to come back to the United States to seek employment when the ditch was completed. Naturally the stories of death by fever and pestilence on the Isthmus that reached this country, exaggerated beyond the actual horrors of the situation, proved an effective deterrent. Often the mothers, wives, or sweethearts of men who had agreed to go down to work on the Canal would come to the employment agencies to beg

tearfully that their appointments be revoked. On the other hand the adventurous feature of the Canal enterprise was the appeal to many a capable young artisan, and patriotism in the sense of a desire to be connected with the great national enterprise was a powerful motive in many instances. As the new men began to arrive on the Isthmus, to ascertain that disease was rapidly being eradicated and that conditions of work were agreeable, they were encouraged to send this information back to their former fellow-workers in the United States. In labor centers all over the country during the latter part of 1905 and the year 1906 skilled workmen whose names had been given by acquaintances on the Isthmus, were receiving from Panama such cables as this: "Come here by next boat and bring two more good men with you. Telegraph office of Isthmian Commission at Washington for transportation." Hundreds of men were recruited in this manner, railroad engineers, trainmen, blacksmiths, carpenters, steam-shovel men, from practically the entire United States. If they proved to be good men, they were encouraged to send for their families, and the

American birth-rate in the Canal Zone during the construction of the new waterway discourages the race-suicide idea.

The records in the Washington office of the Isthmian Commission show that during the first year of the railroad régime on the Isthmus 2311 skilled laborers were carried from the United States to Panama, and 3927 the second year. The greatest number taken down any year since was 1907, during the first year of Colonel Goethals' administration. The Isthmian Commission's fiscal year ends on June 30th, and the railroad régime terminated on March 31, 1907, but it was the railroad men's employment machine that continued to furnish what additional labor was needed until the Canal was completed.

To end the West Indian negro's monopoly of unskilled labor was a problem by itself. Chinese labor not being available, for the reasons already stated, in August an Italian syndicate offered to furnish all the manual labor for the Canal from Italy under an arrangement approved by the Italian Government, the syndicate to secure its compensation through the deduc-

tion of a percentage, fixed by itself, of the wages of the laborers. It was considered, however, that to accept the Italian proposition would mean a stronger labor monopoly than already existed, in that it would be controlled by a foreign government, aside from which it would introduce peonage at Panama.

Like other American railroad men, Mr. Shonts was aware of the success met by Sir William Van Horne in the use of Spanish labor in railroad building in Cuba, and he sent Leroy Park, one of the most active and successful of the special agents of the Department of Labor and Quarters, whose linguistic attainments made him particularly useful in the recruiting of foreign workmen, to reconnoiter on that island.

Mr. Park found that President Palma was strenuously opposed to his taking any Spanish laborers away from Cuba. Several interviews between the two took place; and, as Mr. Palma remained obdurate, Mr. Park, who realized that the Spaniards were just the men to break the labor monopoly on the Canal, decided to hire 500 of them without the presidential consent. The harbor of Havana, in which city he found his

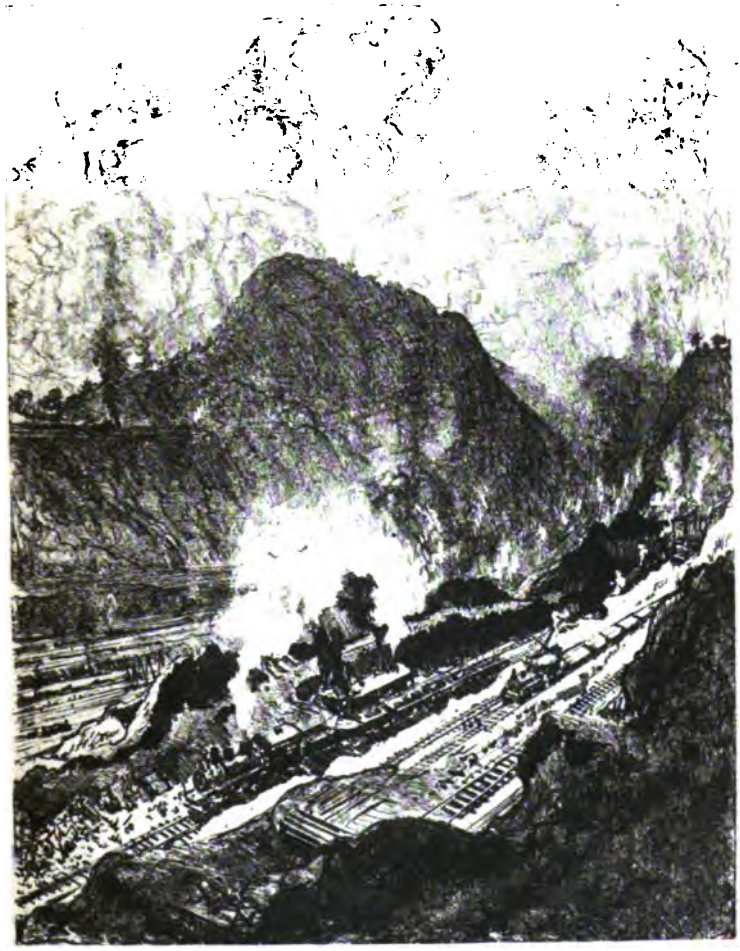
men, being under the authority of the United States Marine Hospital service, to transport them in an American ship would doubtless have led to diplomatic representations and delay. Consequently Mr. Park chartered an English ship that lay in the harbor, and put 300 of the Spaniards abroad when local labor agitators managed to disaffect them with the Panama enterprise. Mr. Park, who believed that it was sometimes worth while in an emergency to subordinate means to an end, sent the vessel out from shore, with his men still aboard; and, to prevent their being taken off by harbor craft, hoisted the yellow flag. The United States official in charge of the harbor was inclined to order the flag down, but a cable sent by Mr. Park to Washington brought him immediate orders not to interfere, and the 300 Spanish laborers were duly landed on the Isthmus of Panama.

The Spanish workmen proved so satisfactory to the Canal organization that Mr. Park was dispatched to Europe to procure more of them on their own soil. It now became necessary to consider what attitude the Spanish and other governments might take in the matter of allow-

ing their subjects to cross the seas to dig the American ditch across Panama. The sanitation of the Isthmus had not been accomplished; and, conditions being only potentially better than when the French workmen were dying in their tracks, no guarantee could be given that the mortality would be any less in the Canal Zone then than it had been in the 'eighties. In ordinary circumstances our consular or diplomatic machinery might have been used to sound other governments on the subject, but that would have meant almost certain refusals to negotiate, and hence put out of the question the recruiting of European labor for Panama. Consequently Mr. Park was constituted envoy unextraordinary and bidden to feel his way for himself, the difficulties of his mission being increased by the fact that its nature became public in Italy and Spain before his arrival, and that both of these governments had determined when he reached their capitals to have nothing to do with him. Neither did the representatives of the United States in Europe greet Mr. Park with any notable enthusiasm, lest acknowledgment of him or his mission might create a diplo-

matic situation difficult of handling. The labor agent was forced to play a lone hand, fortified by a cable from Jackson Smith which read: "I have just these instructions to give you and no more: send men."

Nothing daunted, Mr. Park went to Madrid and put the situation before Señor Moret, the President of the Spanish Cabinet. The minister listened with profound courtesy to Mr. Park's argument, which was that the Canal at Panama being constructed by the United States for the benefit of the commerce of the entire world, it was a high privilege Spain was offered in the opportunity to pay her part of the universal debt of gratitude by allowing her people to assist in its excavation. Señor Moret's reply was, however, disconcerting. "Why should Spain allow her people to do America's labor?" he asked. "If America needs common labor, let her seek it among her own people. The American is too proud to work with his hands! He must work with his head, and Spain must be his hands! Spain refuses to be hands for the American head." An interview with Señor Rios, the leader of the Spanish Liberals, was not



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The Cut from Culebra

UNIV. OF MICH.

much more satisfactory. He assured Mr. Park of his entire sympathy with the Canal enterprise, but declared that of his own initiative he could do nothing in the matter of securing Spanish labor for Panama.

The fact was impressed upon Mr. Park about this time that the Spaniards did not object so much to the emigration of Spanish laborers as to the existence of an American labor agency in Spain, and he therefore established headquarters in Paris, using the Spanish agents of the French steamship lines to recruit workers for Panama, who sailed thither from French ports. He attempted to make a similar arrangement in Italy; and, failing to do so, created a propaganda among French steamship agents whereby laborers from Piedmont and Lombardy, as well as from Greece, Russia, Hungary, Bulgaria, and elsewhere came into France and sailed for the Isthmus from Marseilles or Bordeaux. By this time information had reached Europe that General Gorgas had driven yellow fever from the Canal Zone, and fear of disease ceased to deter workers from seeking big wages there. The transportation expense by rail and water of the

European laborers was advanced by the Isthmian Commission, and deducted from their wages when they began work. Each man underwent a physical examination before he was allowed on board ship by physicians appointed by the Commission. The effect of the European invasion upon the West Indian labor market was most salutary, and the immigrants proved to be such capable workers that ten per cent. of them were allowed to bring their families, also at the Commission's expense. This resulted in the creation of Spanish and Italian colonies in the Canal Zone, and when the railroad régime on the Isthmus terminated workers and their families were going and coming from Spain and Italy, traveling at their own expense and relieving Colonel Goethals' administration of the burden of recruiting labor and of advancing transportation expenses.

Some 8000 laborers went from Spain to work on the Canal, though there were never more than 6000 of that nationality there at the same time. There were 3000 Italians among the manual workers on the Isthmus; 500 Greeks; 500 Bulgarians and Hungarians, and 150 Russians, be-

sides enough other Europeans—English, French, and German—to bring the total up to 10,000. When the railroad régime at Panama ended there were 37,000 men on the Canal pay roll, —10,000 skilled and 27,000 unskilled,—within 5000 or 6000 of the maximum number employed, which means that ninety-nine per cent. of the white labor, eighty-four per cent. of the European labor, and seventy-four per cent. of the West Indian labor was brought to the Canal Zone during the railroad régime.[1]

These were the men who built the Canal, and it was to them that Colonel Goethals thus referred at the farewell reception to his predecessor in Corozal, on March 19, 1907: "I fully realize that Mr. Stevens has perfected an organization, which, if maintained, will carry this Canal through to completion. I want to say here that it is my intention to keep that organization as he has established it." Of that organization Mr. Roosevelt wrote in his autobiography six years later: "A finer body of men has never

[1] A list of the names of the white employés on the Canal, whose annual salaries were more than $2000, with their positions, as the organization was turned over by the railroad men to Colonel Goethals, will be found in the Appendix, page 375.

been gathered by any nation than the men who have done the work of building the Panama Canal."[1]

The food supply proved a serious corollary of the labor problem at Panama. If the men could not be fed, the Canal could not be built. Owing to the fact that the natives never looked beyond their present necessities, no food ever accumulated on the Isthmus, and in the summer of 1905, this disastrous condition was augmented by an almost total failure of the crops for two preceding years, by the abandonment by agricultural laborers of the farms back in the hills for work on the Canal at better pay for shorter hours, and by quarantine of the port of Panama because of bubonic plague, which prevented the delivery of foodstuffs from neighboring provinces. The Commission was thus brought face to face with the problem of feeding 12,000 men and their families, and the nearest available market was 2000 miles away.

Arrangements were immediately made to open local commissary stores at every important

[1] See Appendix, page 400, "President Roosevelt's Endorsement of the Railroad Men."

labor camp, to provide mess-houses, and to furnish food, both cooked and uncooked, at cost. Orders were cabled to have the steamers that ran in connection with the Panama Railroad equipped with refrigerating plants; a cold-storage plant was erected at Colon, and refrigerator cars were purchased for immediate shipment to the Isthmus, thus establishing a line of refrigeration from the markets of the United States to the Commissary stations along the line of the Canal. The net result of these efforts was that all employés were afforded opportunity to obtain an abundant supply of wholesome food at reasonable prices. It was learned from experience that no price for food was sufficiently small to induce the West Indian laborers to eat enough to keep them in good physical condition. They were offered cooked food at ten cents per meal, and the uncooked material at a price reduced by the cost of cooking and service. Both plans resulted unsatisfactorily. The experiment was even tried of giving them uncooked food free; they declined to go to the trouble of cooking it. Then it was cooked and offered to them free, when for the first time they ate

heartily. The plan was then adopted that is followed in railway and other construction work in this country, and we paid the West Indians a fixed wage per day, which included their meals.

When I visited the Canal Zone in 1912, I found that contact with the Spanish workmen under American supervision had considerably improved the efficiency of the West Indian negro since the organization of the labor forces in 1905 and 1906. Not only had he been "speeded up," but he had developed to a point where he could handle a drill,—with a white man in charge of, say, a battery of rock drills.

CHAPTER VII

THE RECONSTRUCTION OF THE PANAMA RAILROAD

THE Panama Railroad, the most valuable instrument to the construction of the Canal acquired by the United States in its purchase from the French on the Isthmus, was within a few months of sixty years of age when the railroad régime in the Canal Zone began. Called into existence largely by the California gold craze of '49, it was the first coast to coast railroad in the history of America; the first all-rail trip between the Atlantic and Pacific had been made on it in January, 1855. The real pioneers of the Panama Canal were the men who cut their way through the jungle, and laid the iron road between the Oceans. It was at a cost of more than 800 human lives and of $8,000,000 in money that the Panama Railroad was constructed.

The Panama Railroad Company was incorporated in April, 1849, under the laws of the

State of New York, "for the purpose of constructing a railroad across the Isthmus of Panama, and of navigating such steam or sailing vessels as may be necessary in connection therewith." The company secured a concession from the Republic of New Granada, which later became the Republic of Colombia, for the exclusive privilege of operating its railroad across the Isthmus, thus prohibiting the government from undertaking, or permitting any person or corporation to undertake, without the concurrence and consent of the railroad company, the construction or working of any canal to unite the Atlantic and Pacific Oceans across the Isthmus of Panama, to the west of the line of Cape Tiburon on the Atlantic and Point Garachine on the Pacific. It was specifically stated in the concession, however, that the exclusive privilege granted to the railroad company did not give it the right to oppose the construction of a canal, except on the actual route of the railroad, while it was given the right to exact an equitable price from the builders of such a canal as indemnification for any damages it might suffer from competition with a water route across the Isthmus.

The Panama Railroad Company paid $250,000 per annum to New Granada for its concession, in addition to transporting over the railroad, free of charge, her mails, soldiers, and government employees. The directors of the company established high charges for the transportation of freight and passengers; and as the railroad long enjoyed a practical monopoly of traffic between the Atlantic and Pacific, it was a big dividend-payer.

When the French company secured its concession from the Republic of Colombia for the construction of a canal across the Isthmus of Panama, its officials realized the importance of controlling the railroad, in order to secure the transportation of the material, supplies, and workmen at reasonable rates, and to prevent the railroad company from exacting an unreasonable payment for the loss it would suffer by reason of competition when the waterway was completed. The Canal Company therefore purchased in the open market 68,888 of the 70,000 shares of the Panama Railroad's capital stock. These shares were a part of the property of the French Canal Company turned over to the United

States when we bought out our predecessors on the Isthmus; and, with a view to securing complete control of the railroad, we then purchased the other 1112 shares from the minority stockholders. The Secretary of War explained the transaction to the Senate, thus: "The Government, of course, while it recognized the obligation to discharge the duties of a common carrier under the charter of the railroad company, was anxious that it might use the railroad as it saw fit to aid in the construction of the Canal. The interest of the outstanding stockholders, of course, was only in securing dividends from an economical operation of the road and management of its finances. They might very well complain, in equity, if the Government, by reason of its owning sixty-nine seventieths of the stock, should ignore their interests and devote the road to the construction of the Canal without regard to dividends." The question whether to surrender the New York charter of the Panama Railroad and operate it and its steamship line solely for the purpose of Canal construction, or to continue it as a New York corporation, taking care of the commercial

traffic it had been handling for so many years, and also using it in the building of the waterway, was one of the first to be considered when the original 68,888 shares of the stock had been transferred to the Secretary of War. It was decided that the Government would not be justified in closing one of the oldest and most important trade routes of the world, upon which so many countries of Central and South America were obliged to depend, and the railroad company was continued under its old charter. The adoption of this policy has been more than justified by the results. Not only has the construction work on the Canal since the reconstruction of the railroad been handled without serious inconvenience to its paid traffic, but the Government has been able, through the medium of the railroad organization, satisfactorily to meet situations that could not have been handled under existing regulations until changed by Acts of Congress.

As soon as the control of the Panama Railroad Company by the United States Government was assured, the directiors who had previously represented the interests of the French Canal

Company were gradually retired. When the Second Isthmian Commission, with Mr. Shonts as chairman, took charge at Panama, the board of directors of the railroad comprised the members of the First Isthmian Commission, with William Nelson Cromwell, who had been the fiscal agent of the Government of Panama; Roger L. Farnham, who was connected with Mr. Cromwell's office and was familiar with shipping affairs; Edward A. Drake, who had been for years vice-president of the road; and Señor Obaldia, the Panamanian minister to the Canal Zone. Mr. Taft, who himself named the board of directors, gave his reasons for making these last selections to the Senate. "I did this," he said, "because I thought it was most important to have the Panamanians understand that they would have on the board three of their friends—Señor Obaldia, Mr. Cromwell, and Mr. Farnham—to protect them against the use of the railroad in any way which would be contrary to their legitimate interests. The selection of Señor Obaldia was a courtesy to the people and the Government of Panama, which I have reason to believe was highly

appreciated. Matters of this sort go very much further with a Spanish-American people than they do with an Anglo-Saxon people." When the railroad men took charge in the Canal Zone, the members of the Second Isthmian Commission were substituted for those of the First on the board of directors of the Panama Railroad, and the writer was also made a member.

At the time that the Panama Railroad Company came into the possession of the United States Government, the road was being run under an exclusive contract with the Pacific Mail Steamship Company, which, by through billing, had secured a monopoly of all business north of Panama to San Francisco. The new board of directors decided that this contract was not one that the Government could afford to continue; and notice was given in January, 1905, terminating it in July of that year. In view of this action the steamship company threatened to withdraw their steamers running between Panama and San Francisco; but, after a conference between Vice-President Schwerin of the company, and Mr. Shonts, the former decided to continue to run the line, as he said, "for an ex-

periment." To provide against contingencies, however, Mr. Shonts purchased, for $650,000 each, the two steamships *Mexico* and *Havana* from the Ward Line, which made the Isthmian Commission independent of other means of transportation for its employees, machinery, and material for the construction of the Canal.

The Second Isthmian Commission adopted a policy with regard to the Panama Railroad that was designed to place all manufacturers and producers throughout the United States on equal terms in regard to the shipment of goods to the Isthmus. How this was brought about cannot be more comprehensively stated than in the following extract from an address delivered by Mr. Shonts before the Commercial Club of Cincinnati in January, 1906:

"We threw open all terminal facilities on the Isthmus to all steamship lines on equal terms. Prior to this time the Panama Railroad, being a private and not a Government corporation, had endeavored to force the shipment of all Canal supplies by way of New York. The management of the railroad required that steamship lines from Gulf ports should charge the same

rates from their ports to Colon as were charged by the railroad's steamship line from New York to Colon, under penalty of being deprived of the railroad's dock facilities at its terminals. The result of this was to give great advantage to the port having the shortest rail line from point of production. As New York was much nearer the centers of production than Gulf or Pacific coast ports, it secured the bulk of the business. When the Government assumed control, by purchase, of the Panama Railroad, one of the Commission's first acts was to notify all steamship lines that they could have the use of the railroad's terminal facilities on the Isthmus on the same terms as the steamships of the railroad company, without regard to any rates they might make from their ports of departure.

"We required all bids for supplies to be made c. i. f. the Isthmus—that is, all bids to include cost of delivery on the Isthmus.

"In order to prevent any charge of discrimination in rates, as between New York and the Gulf and Pacific coast ports, we separated the Panama Railroad Steamship Line from the Panama Railroad and threw open the use of that steamship line to all railway connections at New York on agreed percentage divisions. We gave our direct-rail connections at New York, as well as all others, the privilege of making

rates from all producing territory clear through to Colon. Under this policy the manufacturer situated on the line of a railroad leading to New York has no advantage whatever over the one situated on lines of railway running to Gulf ports. Each can arrange for his own rates straight through to Colon. We went a step further and adopted the policy of charging the Government on the Commission's shipments from New York exactly the same rates that are paid by any other shippers from that port locally. Our object in these various acts was to protect the United States Government from any charge of favoritism to any section of the country or to any port.

"If we had made low rates from New York on our own materials it would have been charged that these were less than private capital could afford to grant, and that therefore the Government should install similar service from the South Atlantic and Gulf ports. We should also have been charged with rebating to ourselves as against other shippers, thus violating the law. What we did was to put the Government on a parity with every other shipper, and all sections of the country on exactly the same footing. If by reason of these policies competition among the railways in different sections of the country shall result in rates below a profitable basis the

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The Cut looking towards Culebra

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Government will be the gainer, because it will get the benefit of a reduced cost in the price of its material delivered on the Isthmus. In no case can the Government be a party to any kind of discrimination."

Indispensable as was the Panama Railroad to the digging of the Canal, its road-bed, ballasted in gravel and rock, which was as fine as any in the United States, was about the only part of it that had not outlived its usefulness. It had but a single track and practically no sidings or station buildings; its telegraph line was worn out, as was its signal system; it had no terminals worthy of the name, and its motive power and rolling stock had been obsolete twenty years before. Just after the railroad men arrived on the Isthmus, Mr. Stevens found nine trains derailed in the ditch along the line at the same time. Canal and commercial traffic, local and through, were nearly at a standstill; thousands of tons of through freight were piled in cars and warehouses or on the docks, and some of these shipments had lain undisturbed from three to eighteen months, in many instances even the shipping papers and freight records having

been lost. Had the docks, wharves, warehouses, terminal yards, locomotives, and cars of the Panama Railroad been in good repair, they would still have been entirely inadequate to handle and properly care for the small commercial business the road was transacting. The existing facilities, poor as they were, were rendered less effective by the entire absence of any mechanical appliances on the docks for receiving or discharging cargo from the steamships. The negro laborer was the only power employed; he was at once the hoisting machine and the traveling crane.

Conditions may be imagined when accumulated orders in Washington for Canal material began to arrive in large quantities on both sides of the Isthmus in August and September, 1905. The situation was aggravated while the congestion was at its densest by an increase of fifty per cent. over the year before in the commercial business of the road, and at the moment when it was believed that matters could not possibly be worse an outbreak of bubonic plague at La Boca resulted in two consecutive quarantines, completely closing that outlet for sixty

days. Furthermore the personnel of the Panama Railroad, as it was turned over to the Second Isthmian Commission, had not been educated on modern lines, and was completely paralyzed when confronted by the onerous conditions caused by the congestion of freight.

The modernizing of the road was a tremendous task, but it was accomplished simultaneously with the sanitation of the Isthmus and the erection of comfortable living quarters for the Canal employees and the establishment of a refrigerating system to supply them with wholesome food. The gauge of the railroad was five feet, while the standard gauge in the United States is four feet, eight and a half inches, a circumstance which much reduced the amount of equipment that could be bought ready-made, and greatly increased the cost of essential material and the delay in getting it to Panama. It was necessary to begin at once the construction of new wharves equipped with modern mechanical appliances and of large terminal yards at both ends of the road; of extensive warehouses, of suitable machine shops, and of a modern coal-hoist-

ing plant. The road was double-tracked with 90-pound steel rails, replacing the 56- and 70-pound rails then on the main line; new and more powerful locomotives and larger cars were purchased for both passengers and freight service, 10- and 12-ton flat and box cars being replaced by those of 40-ton capacity, and the bridges on the road strengthened to enable them to bear the weight of the heavier equipment. The records show that during the first six months of the railroad régime in the Canal Zone, there was purchased for the account of the Panama Railroad 500 forty-ton box cars, 12 caboose cars, 10 refrigerator cars, 6 passenger coaches, 24 locomotives, 2 wrecking cranes, 1 locomotive crane, 1 pile-driver, 300-ton track scales, 1 modern hoisting plant and one cantilever crane. The personnel of the railroad was reorganized, and into the more responsible positions were put experienced, energetic, up-to-date railroad men from the United States, where, indeed, the entire complement of yard and train masters, superintendents of transportation, train dispatchers, and master mechanics, and an army of conductors, engineers, and switchmen were recruited.

In 1907 the Panama Railroad was in a condition to bear favorable comparison with the average of the best railroads in the world. In connection with the railroad the telegraph service was brought up to date, and a telephone system established throughout the Canal Zone as perfect as that existing in New York City to-day.

The new, or re-located line of the Panama Railroad, is 47.11 miles long, or 739 feet longer than the old line. From Colon to Mindi, 4.17 miles, and from Corozal to Panama, 2.83 miles, the old line is used but the remaining 40 miles are new road. From Mindi to Gatun the railroad runs, in general, parallel to the Canal, and ascends from a few feet above tide water elevation to 95 feet above. At Gatun the road leaves the vicinity of the Canal and turns east along Gatun Ridge to a point about four and one half miles from the center line of the Canal, where it turns southward again and crosses the low Gatun Valley to Monte Lirio, from which point it skirts the east shore of Gatun Lake to the beginning of the Culebra Cut at Bas Obispo. In the Gatun Valley section there are a number of Fills constructed from the Canal spoil, which

bring the line above the lake level. Likewise, near the north end of Culebra Cut, where the line is located so as to furnish waste dumps for spoil from the Canal, there are several very heavy Fills. Originally it was intended to carry the railroad through Culebra Cut on a 40-foot berm along the east side, 10 feet above the water level, but the numerous slides have made this plan impracticable, and the line is now constructed, on a grade around the Cut, known locally as the Gold Hill Line. Leaving the berm of the Canal at Bas Obispo, the Gold Hill Line cuts through a ridge of solid rock, and gradually works into the foot hills, reaching a distance from the center line of the Canal of two miles opposite Culebra; thence it runs down the Pedro Miguel Valley to Paraiso, where it is only 800 feet from the center line of the Canal. This section of the line is located on a maximum grade of one and a quarter per cent., compensated, and has a total length of nine and three eighths miles. The sharpest curve on the whole line is seven degrees. From the south end of Culebra Cut at Paraiso, the railroad runs practically parallel with the Canal to Panama, with a maximum

grade of 0.45 per cent. Where the railroad crosses the Gatun River, near Monte Lirio, a steel-girder bridge has been erected, the center span of which will be made into a lift span where the Gatun Lake is formed, to permit access to the upper arm of the lake. The Chagres River at Gamboa is crossed on a steel-girder bridge, one quarter of a mile long, with one 200-foot through truss channel span. Numerous other rivers and small streams are crossed on reinforced concrete culverts. Near Miraflores, a tunnel 736 feet long has been built through the hill.

When the railroad men left the Canal Zone there were more than 6000 men at work on the Panama Railroad; terminals, completely equipped, with power cranes at both ends had been established; there were new warehouses, transfer tables and shops, and from that time until the present the road has never failed in handling promptly, not only all supplies and materials for the Canal, but the freight of the Atlantic and Pacific trade that has passed across the Isthmus.

CHAPTER VIII

HOW THE LOCK TYPE OF CANAL CAME TO BE CHOSEN

It is generally conceded among engineers today that the lock type of Canal, such as the railroad men determined to construct across the Isthmus of Panama, is preëminently the one that should have been built, and that to have adopted the so-called sea-level type would have been a calamitous error, in that it would have cost millions of dollars more than the present waterway and would not now be more than half-completed, while it would in the end be far more difficult of navigation. The Government Commission of Inquiry, to investigate all Canal routes, had reported in 1899 recommending the lock type of Canal, and favoring Panama in preference to the Nicaragua route.

The first Isthmian Canal Commission, headed by Admiral Walker, appointed after the acquisition of Panama were prepared to decide

against the lock type of Canal, after receiving a report from its Chief Engineer, John F. Wallace, and recommended a sea-level Canal similar to the one that had wrecked the DeLesseps Company; so that when the Commission, headed by Mr. Shonts, assumed charge it found the greatest confusion in the minds of all as to the best type of Canal, because of the conflicting and contradictory opinions of the above mentioned Commissions.

Mr. Shonts, as soon as he became familiar with the Canal situation, began to urge upon the President the necessity of coming to a conclusion as to the type of canal to be constructed; and, in June, 1905, Mr. Roosevelt invited thirteen of the most eminent civil engineers of the United States and Europe to consider the various plans proposed for the water route across Panama and report their verdict to him. Thus the International Board of Consulting Engineers came into existence. As finally constituted it was composed of eight Americans and five Europeans, as follows: George W. Davis, Major General, U. S. A. (retired), and member First Isthmian Canal Commission, Chairman; Alfred

Noble, Chief of the Board of three engineers appointed by the Pennsylvania Railroad Company to take charge of the construction of the New York Terminal of that Company, including the tunnels under the North and East Rivers; William Barclay Parsons, Chief Engineer, Rapid Transit Commission, New York City, and member First Isthmian Canal Commission; William H. Burr, Professor of Civil Engineering in Columbia University, New York City, and member first Isthmian Canal Commission; Henry L. Abbot, Brigadier-General, U. S. A. (retired); Frederic P. Stearns, Chief Engineer of Metropolitan Water and Sewerage Board of Massachusetts; Joseph Ripley, Principal Assistant Engineer of the Sault Sainte Marie Canal—the chief civil engineer engaged on that work; Isham Randolph, Chief Engineer, Chicago Drainage Canal; William Henry Hunter, Chief Engineer, Manchester Ship Canal, nominated by the British Government; Adolph Guerard, Inspector of Bridges and Highways, France, nominated by the French Government; Eugen Tincauzer, Chief Engineer Kiel Canal, nominated by the German Government; J. W. Welcker, Chief Engineer of

Waterstaat, nominated by the Netherlands Government; and Edouard Quellennec, Consulting Engineer, Suez Canal.

The law by which Congress ordered the construction of an Isthmian Canal, which gave direction to the deliberations of the International Board, runs thus:

"The President shall then, through the Isthmian Canal Commission hereinafter authorized, cause to be excavated, constructed, and completed, utilizing to that end, as far as practicable, the work heretofore done by the New Panama Canal Company of France, and its predecessor company, a ship canal from the Caribbean Sea to the Pacific Ocean. Such canal shall be of sufficient capacity and depth as shall afford convenient passage for vessels of the largest tonnage and greatest draft now in use, and such as may be reasonably anticipated, and shall be supplied with all necessary locks and other appliances to meet the necessities of vessels passing through the same from ocean to ocean; and he shall also cause to be constructed such safe and commodious harbors at the termini of said canal and make such provisions for defense as may be necessary for the safety and protection of said canal and harbors."

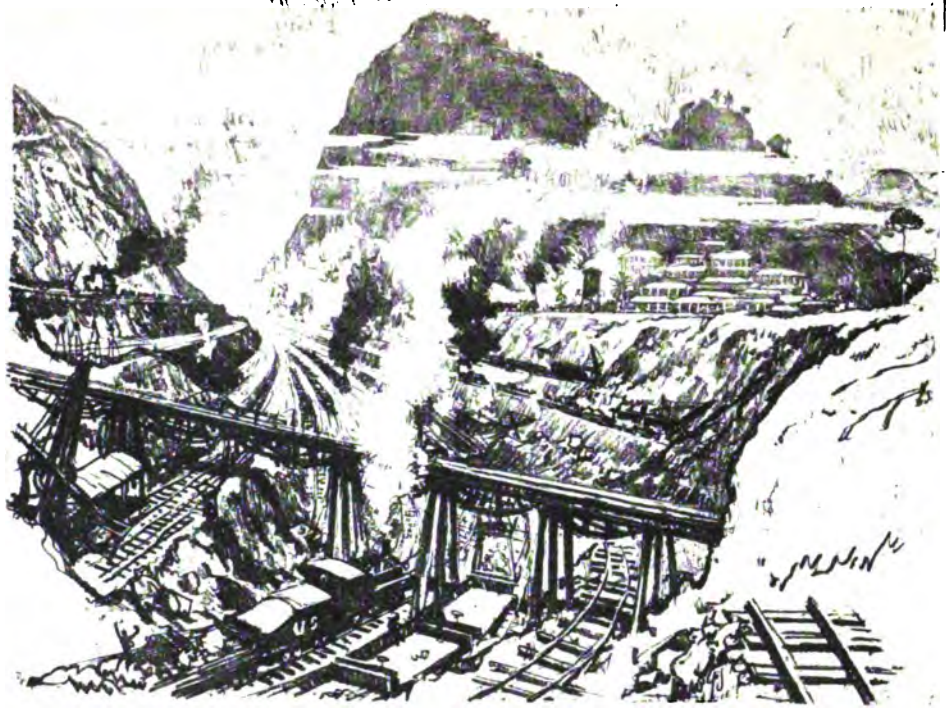
The International Board met at the office of the Canal Commission in Washington, in September, 1905, continuing its deliberations until the following January, in the meantime paying a visit to the President at his summer headquarters at Oyster Bay, and inspecting the site of the Canal at Panama. Mr. Roosevelt told the engineers that two of the prime considerations to be kept steadily in mind in the matter of the canal type were the utmost practicable speed of construction, and practical certainty that the plan proposed would be feasible—that it could be carried out with the minimum risk. "There may be good reasons," he said, "why the delay incident to the adoption of a plan for an ideal canal would be incurred; but if there is not, then I hope to see the Canal constructed on a system that will bring to the nearest possible date in the future the time when it is practicable to take the first ship across the Isthmus; that is, which will in the shortest time possible secure a Panama waterway between the oceans of such a character as to guarantee permanent and ample communication for the greatest ships of our Navy and for the largest steamers on either

the Atlantic or the Pacific. The delay in the transit of the vessels owing to additional locks would be of small consequence when compared with shortening the time for the construction of the Canal or diminishing the risks in the construction."

It was on November 18, 1905, that the International Board of Consulting Engineers reached a final vote, when a resolution in favor of a sea-level canal was adopted by a vote of eight to five, Messrs. Ripley, Randolph, Stearns, Abbot, and Noble being the members in favor of a lock canal. It was not until January 10, 1906, that the Board presented majority and minority reports to the President, and in the meantime the advocates of each plan, in Congress and out, waged war upon the other, the lock canal project being known as the "American canal" as distinguished from the sea-level, or "European canal." Mr. Shonts took an active part in the campaign for the lock canal, and the President finally referred both reports to the Isthmian Commission, of which he was chairman, through the Secretary of War. Early in February Mr. Shonts made a report to the Secretary of War,

concurred in by the other members of the Commission (with the exception of Admiral Endicott) and by Chief Engineer Stevens, approving the lock canal project favored in the minority report of the International Board. On February 19th Mr. Taft transmitted the majority and minority reports of the Board, with that of Mr. Shonts, to the President, accompanied by a letter in which he concurred with Mr. Shonts in recommending a lock canal, and the same day all the documents went to Congress with a brief message in which the President endorsed the views of the Secretary of War and the Chairman of the Isthmian Commission.

In an address before the Chamber of Commerce of Atlanta, Georgia, the following May, Mr. Shonts presented his side of the controversy on the type of canal. The address was published throughout the country and considerably affected the public mind. Having referred to the opportunities of the South, by reason of its proximity to the Canal Zone, for the sale of material and supplies for the construction of the waterway across Panama, and for the development of commerce after its completion, Mr. Shonts, said:



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The Cut at Paraiso

"But gentlemen, between the time of selling your supplies which will enter into the construction of this canal, and the period when the opening of the canal will result in this great development of your country, a gulf is fixed. How great and wide that gulf is will depend on the type of canal selected. The present commission believes that the type of canal the people of this country want is the one which will provide adequate and safe passage for the largest vessels now on the seas, or which can be reasonably anticipated, and which can be constructed in the quickest time and at the least cost. It has, therefore, recommended the construction of an eighty-five foot level lock canal, for the reasons that, first, in its judgment, it can be completed for about half the cost, and in about half the time, of the so-called sea-level canal; second, because it will be adequate for all the commerce which can reasonably be expected to seek that route during the next hundred and fifty years; third, because if the tonnage should increase beyond such expectation it can be enlarged more cheaply and more quickly than the so-called sea-level canal; fourth, because, from the operating point of view, large ships can be put through more safely and more quickly than through the sea-level; fifth, because, when the interest on the difference in the estimated

cost of construction is added to the estimated cost of operation, the saving to the Government every year will be $2,340,000; sixth, because, when built, it will be a completed canal, completed in every appointment, for all requirements for generations to come.

"The so-called proposed sea-level canal is not, as is popularly thought, a straight, open, and uninterrupted channel through which ships can freely pass from ocean to ocean, but is in the first place equipped with a large tidal lock, the most objectionable and dangerous lock, from an operating standpoint, in use; while the canal itself is a deep, narrow, tortuous gorge, which large ships can not navigate, even according to the estimate of the men who recommend that type of canal, at a greater speed than four miles an hour, and which will contain at times, according to the same authority, a current in one direction of 2.6 miles an hour. Eighteen streams will pour their waters into this deep and narrow chasm, at heights ranging from fifteen to one hundred and thirty feet, creating not only the main current just mentioned, but creating in addition cross currents where each stream enters the canal. I venture to say that no large ship, occupying, as large ships will, 40 per cent. of the prism through which they will pass, can navigate at that speed through and with those currents,

safely, under its own steam. I venture to say further that in my opinion no ship-owner would permit a large-sized vessel to make the attempt. As a result, it would not be thirty days after this type of canal was finished as planned before Congress would be called on for an appropriation with which to begin the work of enlarging it.

"The lock canal, on the other hand, as recommended by the minority of the consulting board and indorsed by our Commission, will have thirty-five miles of free lake navigation, so that the difference in time of putting large ships through the locks will be more than offset by their speed through the lake portion of their trip, which is more than two thirds the entire length of the canal. The locks, themselves, as planned, will accommodate ships having twenty-five per cent. greater tonnage than the two giant Cunarders now building,[1] and which will be the largest ships in the world, while the double gates provided for each outside lock and the machinery and methods which will control the

[1] The *Mauretania* and *Lusitania*. It may be noted, incidentally, as illustrating steamship growth, that these sister ships, in 1906 the giants of the transatlantic service, are of 32,000 tons gross tonnage; 790 feet in length and 88 feet in breadth, and of 60.6 feet in depth. The *Vaterland* of the North German Lloyd Steamship Company, the giant of to-day is 55,000 tons gross tonnage; is 950 feet in length and 100 feet in breadth, and of 63 feet depth.

movements of all vessels into and through the locks will make an accident to any vessel, no matter what its size, almost an impossibility.

"In regard to its tonnage capacity: no man can estimate with any degree of accuracy the volume of tonnage which will go through the Panama Canal. The only guide we can have is the traffic of the Suez Canal. Taking the development of the traffic in the Suez during the thirty-five years of its existence as a basis, and continuing the same ratio of increase until the year 2000, the volume of traffic passing through that canal will be in that year, in round numbers, 42,500,000 tons; or estimating that the Panama Canal, if constructed on the plans which this Commission has recommended, will be open for traffic in 1915, and estimating that the volume of traffic passing through it the first year will amount to 7,000,000 tons (which is the best guess that experts have been able to make), and applying the same ratio of increase to that traffic which experience has shown to have developed in the Suez, the volume in the year 2000 will have reached 35,000,000 tons. The estimated capacity of the lock canal, as recommended by our Commission, is 50,000,000 tons per annum. Unless the development of the population of the world changes the basis of our estimates, the type of canal we recommend

will be adequate for all business that may be thrown upon it during the next century and a half."

Before his address at Atlanta, Mr. Shonts had, in March, urged upon the Committee of Inter-oceanic Canals of the Senate, the necessity of acting at once upon the report of the Board of Consulting Engineers, because of the handicap which the uncertainty as to the type of canal imposed upon the Isthmian Commission. "Mr. Stevens to-day has quite a large force of civil engineers," the Chairman told the Committee. "If a certain type of canal is decided on, he has an excess of some kinds of engineers and not enough of others. If the other type is decided on, the position is reversed. We have men who have accepted positions provided a certain type of canal is to be constructed, one man particularly, whom we may lose. And we are very anxious, if a lock canal is adopted, to secure his services, because we think he is the best expert on locks in the world. We have a big force at work and our preliminary work is pretty well along. We are setting up our machinery and doing all we can, but we are uncertain as to continuing

certain lines of work, because if a certain type of canal is decided on that work will be worthless; and we do not want to be criticized. We can not 'abandon the fort,' we can not stop working; and we do not want to make any mistakes. I simply want to urge on you before leaving that you do everything possible to hasten the decision regarding the type of canal. I consider it the most pressing practical question before us as a Commission."

Senator Millard, the Chairman of the Interoceanic Canals Committee, was able to appreciate the situation, and the report and recommendations of the Isthmian Commission were taken up at once. Finally on June 21st, the lock-canal project was approved in the Senate; on the 27th the House of Representatives concurred, and on the 29th President Roosevelt affixed his signature and the discussion was over. From that time on the work of construction of the Panama Canal went forward until its completion with a celerity unprecedented in the history of building operations.

In February, 1909, the *Engineering News* published an editorial on "The Reasons Why

the Lock Plan for the Canal is Preferable to the Sea-Level Plan," which began thus:

"Three years ago, after long and careful investigation, the United States Government decided upon the lock plan of construction for the Panama Canal. This decision was made in conformity with the weight of the best engineering opinion. We say this advisedly and with all due respect to the engineers on the International Board who, at that time, from such knowledge as was then available, favored the sea-level plan. Secretary Taft and President Roosevelt, in making the final momentous decision in favor of the lock-canal plan, accepted the opinion of such leaders of the engineering profession as Alfred Noble and Gen. Henry L. Abbot, who had given more thorough study to the Isthmian Canal problem than any engineers in this country or elsewhere; of Mr. F. P. Stearns, whose eminence in the field of hydraulic engineering is well-known to every member of the profession; of Mr. Joseph M. Ripley, with his long experience at the Soo Canal and its great lock, by far the greatest Canal in point of traffic and by far the greatest lock in size, to be found in the world; of Mr. Isham Randolph, the engineering creator of the Chicago Drainage

Canal, which ranks with the greatest canals on the globe. Besides these engineers the lock canal plan was supported at that time by the engineers of the Isthmian Canal Commission, Gen. Peter C. Hains, Col. O. H. Ernst, and B. M. Harrod, past-president of the American Society of Civil Engineers. It also received the emphatic indorsement of Mr. John F. Stevens, then chief engineer of the Canal work, and familiar, from close personal contact, with the problems involved in the question as to the relative merits of the two types. We repeat, therefore, that Secretary Taft and President Roosevelt, in making the final momentous decision in favor of the lock canal plan three years ago, acted according to the best advice of the American engineering profession. From that time to the present we believe, the Canal enterprise and the plan on which it is being carried out has deserved and has, we believe, received the general support and approval of American engineers."

Although the *Engineering News* does not mention the name of Mr. Shonts, his was the executive intelligence that translated mechanical theories into practical facts for the President and the Secretary of War, and forced them upon Congress.

In his address to the Chicago engineers, from which I have quoted before, Mr. Cornish elucidated the situation as follows: "It is well known to all of you how quickly Mr. Theodore P. Shonts, the Chairman of the Second Commission, and Mr. John F. Stevens, the second chief engineer, each vested with greater authority than his predecessors, and working harmoniously together, brought order out of chaos, and little can be said now without repetition, but so far as the speaker is aware, Mr. Shonts never had been given credit publicly for winning a certain great victory during a most critical period of Canal history. A majority of the International Consulting Board, appointed by President Roosevelt to investigate, confer, and recommend as to the type of canal which should be constructed, recommended a sea-level canal, whereas a minority report recommended the lock canal. At the present time there are few people but will acknowledge that the final decision in favor of the lock canal was the proper one, but at that time the adherents of the sea-level route were many and powerful and a bitter fight was made by the Press and

in the Senate by the sea-level advocates. Mr. Shonts realized fully the practicability of the lock canal under any condition of traffic reasonably to be expected, and knowing it could be constructed within reasonable limits of time and money, recommended to the President the adoption of the minority report and thenceforth labored unceasingly in behalf of the lock-canal project, furnishing the ammunition and largely directing the fight waged in the Senate which ultimately resulted in the adoption, by the narrow margin of five votes, of the lock-canal plan, and to Mr. Shonts is due the credit, far more than to anyone else, that the United States has to-day a completed lock canal instead of a half completed sea-level canal."

CHAPTER IX

PANAMA IN 1907

"It was hell down there six months ago, but it's all right now." This forceful, if inelegant observation with respect to the Canal Zone was made to Frederick Palmer, war correspondent and magazine writer (and was recorded by him in Collier's *Weekly* of February 2, 1906), before the railroad men had been on the Isthmus a year, by a returning resident on a ship bound from New York to Panama. When—in accordance with his understanding with President Roosevelt that he might resign from the Isthmian Commission, should he so desire, as soon as he had brought the work on the big ditch to a full headway—Mr. Shonts retired from the headship of the Canal organization, in April, 1907, Panama possessed as few attributes of the infernal regions as most other communities in this sinful world, and under Mr. Stevens,

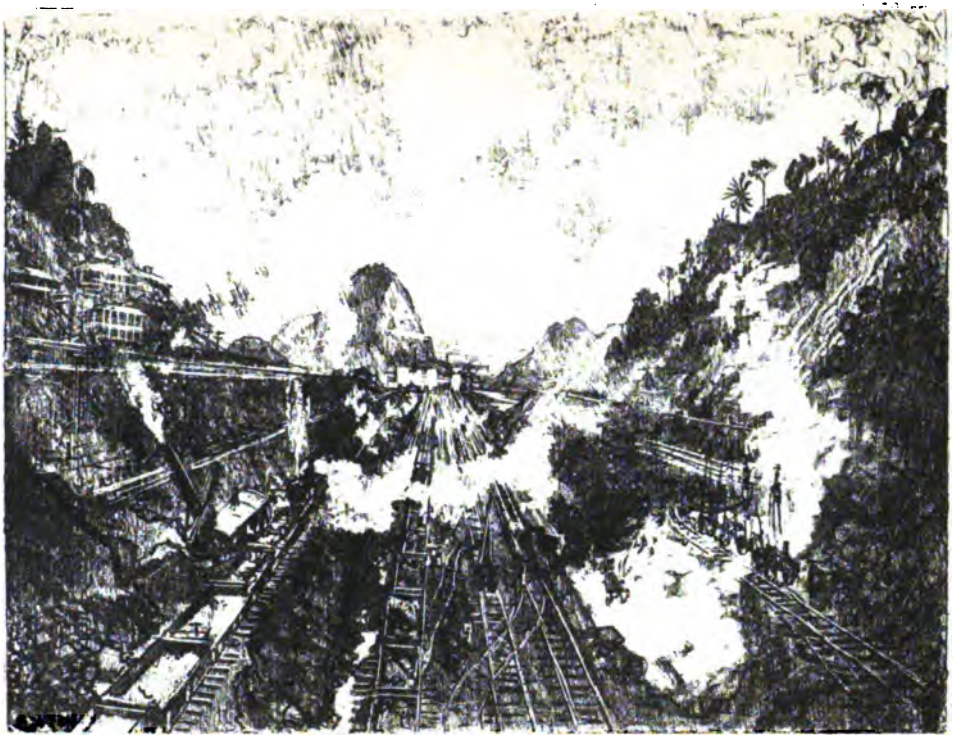
with whose resignation from the same position as Mr. Shonts a month later, the railroad régime on the Isthmus ended, as under Colonel Goethals since, she has more than held her own in the matter of hygiene, law and order, industry, and the other definite symbols of modern civilization. Indeed, it was an ideal community, from the pragmatist's viewpoint, that had its being in the Canal Zone, for there was no privileged class, no idlers; every adult had a part in the great project that had brought 35,000 men with their families together there.

Right across the ten by fifty mile strip of United States territory along the line of the Canal, there was in 1907 a succession of trim villages containing populations ranging from a few hundred up to five thousand, living in comfortable houses screened from the invasion of mosquitoes, and provided by refrigerator cars with wholesome food, and by modern aqueducts with pure water, where two years before there had existed a jungle with occasional clearings for labor camps, in which the only buildings were sheds like that complained of by young Carroll of McKeesport in an earlier chapter, where

working men slept six in a room, drank rain water, and lived on "meals that would sicken a dog." At Gatun, the site of the great dam which now holds back the waters of an inland lake of 164 square miles, there was a village which had sprung into existence in four months, situated on the hill top, overlooking the quaint native village on the banks of the Chagres River below, which is to-day eighty-five feet under water. The site of Culebra (now the headquarters of the Canal administration), builded on bluffs overlooking the great cut and surrounded like an amphitheater by rising slopes of beautiful hills, a town of 5000 inhabitants, had been covered by an impenetrable forest, with scarcely a sign of human habitation, when the railroad men came to the Isthmus. Within a few miles of Culebra, were three other towns each of 5000 inhabitants—Empire, Las Cascadas, and Gorgona, that had existed only as groups of hovels in the wilderness six months before, while by means of refrigerating plants on the government's steamers, a cold storage plant at Colon, and refrigerator cars on the Panama Railroad, there was a continuous line of food supply

between the towns and villages along the line of the Canal and the markets of the United States.

Each one of these towns and villages was supplied with pure water by a modern aqueduct and contained the latest sewerage system, and in each one, in addition to the quarters for the employees of the Canal, there were hotels, mess halls, club houses, and recreation buildings. It was no longer necessary for the men to go to Colon or Panama after working hours to look for amusement that might have been of a questionable kind, for these recreation buildings, each with its gymnasium, its reception, card, and billiard rooms and its assembly hall, managed in conjunction with the Young Men's Christian Association by boards of directors selected from among the employees, provided them with pleasurable occupation outside of working hours. Each of these clubs had its own board of directors, as has been said, but all were under the control, so far as broad principles were concerned, of a general board selected by the Isthmian Commission. The problem of entertainment and recreation, however, was solved in great measure



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In the Cut towards Ancon Hill, Panama

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by the men themselves, who had established societies, fraternal orders, and athletic associations all along the line of the Canal. . . . There were some two thousand American women and children on the Isthmus, and the number was constantly increasing when the railroad régime ended, so that social functions participated in by both sexes were becoming more and more frequent. The Canal Zone was no longer an Eveless Eden.

When the railroad men turned over the administration of affairs on the Isthmus to Colonel Goethals, the cities of Colon and Panama no longer deserved the reproach of being "two of the most forbidding, dirty, and from a white man's point of view, unhealthy places on earth," as Mr. Stevens described them on his arrival. In 1907 Panama was the best-paved, the best-watered, and the best-sewered city in Central America or the northern half of South America, and the railroad men had constructed a great reservoir with an abundant supply of pure water, and installed a fire service that on two occasions saved the city from destruction. A reservoir had been constructed for Colon also,

one with a capacity of 508,000,000 gallons. The main street of Colon had been paved with vitrified brick, and the surface of other streets had been raised and covered with crushed rock.[1]

Adjunctive to the main issue on the Isthmus, the construction of the Canal, the state the railroad men created in the Panamanian wilderness lacked none of the essentials of modern civilization. There was a supreme court with a chief justice and two associate justices, a circuit court with three, and a district court with four, judges; there was a prosecuting attorney; there were 19 schools, with a superintendent, 36 teachers, and more than 1600 pupils; there were 17 post offices, with 17 postmasters, 30 clerks, and 22 messengers; there were 14 police stations, a jail, and a penitentiary, with a chief of police, a first and second lieutenant, 11 sergeants, 19

[1] Mr. Stevens corrected the general misapprehension as to this feature of the work of the railroad men in his address before the Oregon Society of Engineers. "Recently I have noticed in local newspapers very flattering comments on the present conditions as regards streets, sewers, and water supply in Colon and Panama," he said. "These are all true, but I want to remark in justice to the engineers in civil life who designed and built these works and wrought these changes, that all this was done prior to the advent of the army engineers, and was not done by the latter, as stated by the article in the press to which I have referred."

corporals, and 159 patrolmen, and also a chief clerk and seven subordinate clerks; there was a fire department with seven stations in the seven principal towns of the Canal Zone, a chief and an assistant chief and 26 paid firemen, as well as 12 volunteer fire departments in 12 towns and villages; there was a division of public works, with 13 inspectors and 16 men in such subdivisions as plumbing, water, sewers, paving, markets, and slaughter houses, and there was a revenue department divided into administrative departments, that took care of customs, internal revenue, and the administration of estates. The prisoners from the penitentiary, averaging about a hundred in number, were engaged in building roads, as a result of which there are more miles of macadamized roads throughout the Canal Zone than in all the rest of the Republic of Panama.

On the work pertaining to the actual construction of the Canal more than 37,000 men—Americans, Europeans, and West Indians—of the total of 43,000 employed up to its completion, were on the Government pay-roll when the railroad men left the Isthmus. Creating a

45-foot channel four miles out of the harbor of Colon, and at work in the three divisions of the big ditch itself, 12,000 men of the department of excavating and dredging were operating three dredges, 63 steam-shovels, 132 locomotives, and more than 1500 cars, removing dirt and rock at the rate of approximately 600,000 cubic yards per month. When Mr. Shonts resigned, every American on the Isthmus was looking forward to the day when the Canal Commission might announce to the world a record of the removal of one million cubic yards of spoil per month. The one million cubic yards proved to be just over the border, for during the final month of the railroad régime the record was 983,000 cubic yards.

Dredging operations were going on from Colon Harbor as far as the Gatun Locks, where excavations were being made for the construction of the three locks in flight, each of these locks being then planned to have a clearance of 1000 feet in length by 100 feet in width, which has since been changed to 110 feet in width. Here the building of the Gatun dam was in actual course of construction. Between Gatun

and the Culebra Cut other than secondary work had not been begun, because Chief Engineer Stevens considered that, as it was only a question of a brief period of time to reach grade at all points, there was nothing to be gained in starting the work three or four years before it was actually necessary, and he thus prevented the locking up of appropriations that might be needed and could be used more advantageously upon other sections of the Canal. At Culebra Cut, not only had the plans been completed for the excavation, but the tracks were laid, the dumps were in existence, and the spoil from fifty-three steam-shovels (the records show that the greatest number of steam-shovels ever used in Culebra Cut was sixty-four) was being moved down grade to them. At Pedro Miguel, the southern terminus of the Cut, preliminary work had already been begun upon the excavation for the lock, and from this point to Balboa surveys were being carried on to determine the most advantageous sailing line in the lake formed by the dam that was to have been built at the latter point.

Supplementing the labors of the 12,000 men

engaged in the actual excavation of the Canal, there were more than 2100 at work in the department of locks and dams; more than 2800 in that of municipal engineering; more than 3500 in that of motive power and machinery, keeping the plant in order; more than 3800 in that of building and construction of houses, stores, and warehouses; more than 2400 in that of sanitation, keeping the malaria mosquito down; more than 2000 in that of labor and quarters, feeding and taking care of the rest, and more than 1200 in that of material and supplies. The chief engineer had 57 clerks in his office; the disbursing officer had 141 subordinates; the examiner of accounts 101, and there were three men in the office of the secretary of the Commission.

Little has been written of the social life of the Isthmus, for the very good reason that nearly every resident and visitor has been occupied solely with business, while the professional writers have been interested principally in the Canal itself. However, a courageous nurse, Miss Bessie Murdock, who went to Ancon Hospital in 1904, has contributed to the Year

Book of the Society of the Chagres some personal experiences during the period that Colonel Gorgas was getting together hospital forces second to none in the world and exterminating yellow fever and the railroad men were civilizing the Canal Zone, that give an idea of conditions on the Isthmus other than those more directly connected with the actual digging of the Canal.

After describing the forty-seven mile railway trip across the Isthmus from Colon, Miss Murdock proceeds:

"We got into a brake, a Jamaica negro cracked his whip, and we jolted along over unpaved streets, finally arriving at the gateway leading into the Ancon grounds. On entering, it seemed as if we were being driven through a beautiful but neglected park. Everywhere was the evidence of artistic design in landscape gardening, but so overgrown were the shrubs and plants, and so rank the undergrowth, that little of the original beauty was discernible, and only noisomeness and slimy reptiles were suggested by the luxuriant vegetation.

"One feature, however, made a never-to-be-forgotten impression,—the stately rows of royal

palms with their drooping fronds swaying far above our heads, like steadfast and undaunted sentinels of a community life inaugurated by the French régime, now to be advanced to a completion far exceeding their most sanguine expectations. It was a climb from one terrace to another until we were about half-way up the mountain, finally reaching what was then known as Ward Fifteen, the temporary quarters for the nurses.

"Upon our arrival, preparations for afternoon tea were started, but the wind blew the alcohol flame in the wrong direction, and we were really quite faint when the stimulating brew was at last ready for us. In the meantime, we had been looking about. A large ward was our dormitory. Old rusted iron French beds, with mildewed mattresses and pillows lined the walls. It was a case of first come first served. Each made a dash for what she thought was the best location. A glimpse had been caught of two nice fresh white enamel beds belonging to two nurses who had preceded us by an earlier steamer, and, while we were getting ready what was to be both bedroom and dressing-room for eight persons, we thought enviously of their superior comfort. Fresh linen and mosquito bars, the latter a novelty to us, were supplied from the storeroom, and by the time the six o'clock dinner

was announced we had our house in order and our appetites whetted for our first Spanish meal, with its many surprises, the chief of these being the announcement by Rosina, who appeared with bare feet, attired in a loose bodice, short skirt, and bandana, flourishing a ladle in her hand, which she wiped on her apron as she walked into the dining-room. Each one was assigned to her place at the table, Rosina taking acute notice as to whether or not we understood the etiquette of using the six plates piled in front of each, ignorance on which point relegated the unfortunate one to a low place in her esteem, as not being to the manner born.

"As we sat down to dinner, we were surprised to see lighted candles on the tables, for the sun was still shining brightly. In a very few minutes we understood the reason for this, as there is no twilight in the tropics, and before dinner was finished the room would have been dark without them. The meal consisted of okra gumbo, a fillet of beef, sweet potatoes, Spanish macaroni, shrimp salad, and pineapples for dessert, with very good coffee, the six plates being used in their proper sequence. The cooking was excellent, the service à la Rosina was entertaining, and the inner woman being refreshed, we repaired to the balcony and there awaited developments, the first being an attack upon us

by the much-dreaded anopheles mosquito. In a very few moments one and then another declared that it was impossible to remain outside, as we were being eaten alive by the mosquitoes and sandflies. We sought refuge in the dormitory, and were informed that the best thing to do was to go to bed. Each had a candle, but it was soon found that it was not wise to keep these burning, as they attracted moths and all sorts of flying insects. Yet, in spite of these many difficulties, we were not disheartened, but thoroughly enjoyed the novel experiences.

"The next morning we were told that a patient had died of yellow fever and that there were several other cases in the hospital. Some were frightened at this, but details were assigned, and we went to work. One ward was occupied by white patients, another by negroes, these two being the only wards in use.

"The Sisters of St. Vincent de Paul were in charge, women of much refinement and charm. They had been in complete control of the Hospital during the French régime, and with the incoming of the United States Government it was decided that they should stay on and be a part of the nursing force until the end of the year. They had their own community life, and with their religious services and their rather unusual garb they added much to the

picturesqueness of the surroundings. We were told that these Sisters had done heroic work in the face of great difficulties and poor facilities.

"The hospital, although a marvel of artistic design, well planned and ventilated, was of course destitute of all modern up-to-date conveniences. In its construction, labor-saving and time had not been considered, as the some forty-odd buildings making up the hospital were scattered over a number of terraces, and occupied a very large territory. The buildings were all at that time of one-story, surrounded by 'galleries' of verandas, and roofed with red Spanish tiles. Around these verandas were planted shrubs and plants, all more or less neglected, but showing the French love of beauty and harmony, as well as of the more practical needs of the sick.

"The cleaning and repainting of the wards advanced rapidly. Equipment was placed, and each day showed gratifying progress in the ability to meet the demands of the steadily increasing number of patients. The buildings were without wire nettings, necessitating a mosquito bar for every bed, which made it a little difficult to attend the patients but, when yellow-fever patients were admitted, a wire cage was built about the bed. For those nurses who had to take duty at night, there was no wire cage in which they might seek protection from the

pestiferous mosquitoes, their only relief being obtained by swathing themselves in bandages soaked with oil of citronella.

In the meantime, the grounds were being policed. Whole battalions, armed with machetes were mowing down every green thing that stood in their way. Much regret was felt by us when we beheld the destruction of a noble cedar of Lebanon which stood close by our veranda. If by any chance the overseer did not designate each blade to be spared, these men showed no discrimination. When all was finished, there remained no further entrancing mysteries, but there were revealed to view many pieces of statuary, chiefly figures of saints, which had decorated the grounds, and, being considered innocuous, were, for the time, left in place. For the future, matters were to be conducted on strictly sanitary lines.

"We were yet to have water works and a sewage system installed, up to this time the water supply having been obtained from a small reservoir and overground cisterns which stored the water collected from the roofs. During the rainy season the supply was abundant, but when the long dry season arrived water had to be used in the most sparing quantities, and for days at a time baths of all sorts were prohibited.

"Each week added to the number of our nurs-

ing staff, recruits coming from active service in all parts of the world,—the Philippines, Cuba, Africa, China, Japan, England, and Canada,—each contributing details of value. The increase, of course, necessitated further accommodations, and arrangements were made for taking over the Strangers' Hospital further up the hill, for permanent quarters. This hospital derived its name from the fact that during the French occupancy the only patients admitted were those who were sent in by the foreign consuls. About this time nearly every one in the entire community was afflicted with malaria, and yellow fever had carried off several fine young men.

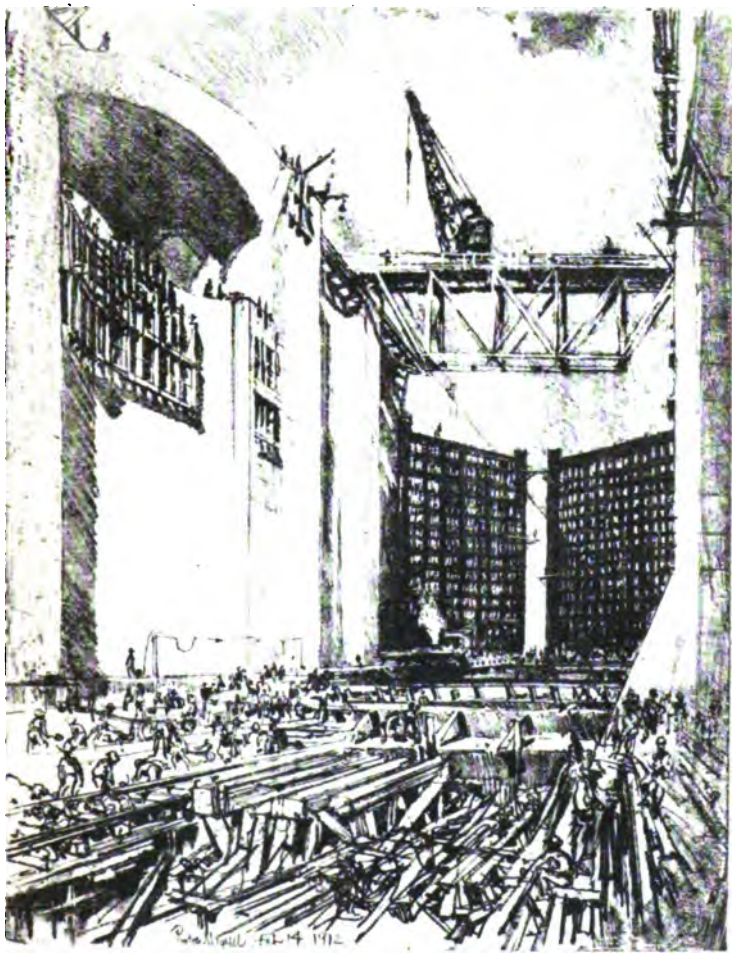
"Being the only women connected with the work, we valiantly tried, when off duty, to live and surround ourselves with a little of the home life we had left two thousand miles behind. Our first social affair was a card party, and on Hallowe'en, a month later, several charming young bachelors gave a unique little 'evening.' Nothing that was attempted later seemed so original.

"Later on, we ventured into the field of drama, and put on a little play called *The Traveling Delegate*. An all-star cast was selected, but the stage management disagreed on a few technical points, so after many difficulties it was ready for the evening of Thanksgiving. We

were still very dependent on candles, though some favored few had been granted kerosene lamps which were loaned for the occasion and used as foot-lights. A string orchestra from Camp Elliott supplied the music, and when the play was over the 'terpsichorean devotees' tripped gaily until midnight, unmindful of the fact that there had been hanging over the Zone a threat of invasion from Colombia. Ancon had been assigned a special patrol of marines, and several battleships were at anchor in the harbor.

" Early in December, toward the end of the wet season, yellow fever and other forms of sickness became more prevalent, almost causing panic. Had we allowed ourselves to do so, we would have lost heart completely, for death seemed to dominate the situation. But the unselfishness and splendid administrative skill by which our work was arranged made every one feel that we too must do our work courageously, and in the trying days when one of our number was stricken, no one showed the white feather but all stood faithfully to their tasks. There were many anxious days, and not until our trusted yellow-fever specialists said that all danger was passed did we feel any ease of mind.

" Previous to the outbreak of the fever, orders had been issued prohibiting all visiting in the City of Panama. This was indeed a hardship,



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The Bottom of Pedro Miguel

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as we delighted to wander through its quaint narrow streets, visit its cathedral and churches, rummage through the old Chinese shops and junkshops where much old-fashioned jewelry and many rarities could be obtained for very little, and señoritas were seen in the plazas during the late afternoon.

"Through the kindly consideration of all the officials, much was done to make conditions comfortable and pleasant for us, and our superintendent being a woman who had been prominent at the Court of St. James, our entire corps enjoyed the best social standing. Afternoon tea was frequently honored by the presence of distinguished guests, including British and United States Naval officers, as well as those engaged on the Isthmian Canal Commission. These diversions, however, formed only a small part of the daily life. We were taxed to the utmost in the effort to care for the sick and keep hope and encouragement alive. The *esprit de corps* was excellent.

"Late in the summer of 1904, our first Ancon baby was born, and upon it was conferred the special honor of being baptized 'Theodore Roosevelt.'

"Quiet little romances were going on in our midst, and in December, six months after our arrival, the first engagement was announced,

but it was not until May, 1905, that the first wedding was celebrated. It was a pretty ceremony, and was one of many weddings that followed in rapid succession during the year.

"Time with progress was forging ahead, as a special visit to Colon proved. Where we had seen nothing but jungle on our first trip, gray villages had sprung up all along the line of the Canal. The great steam-shovels, acting like human beings, were making much ado, and there was buzzing and humming everywhere. We nurses were no longer respectfully gazed at because we were the only women connected with the work, for women and children were arriving by every boat. Homes were being established and a sense of domestic comfort pervaded the settlements. The advent of women meant the development of social life, and various clubs were organized.

"Before two years were over, we were surrounded by all the modern comforts and conveniences. Telephones buzzed, electric lights were flashed on, and we recognized ourselves as only a part of an ideal community. It would be hard for any one to-day to believe that Ancon had ever gone through a pioneer stage. We were glad to have had a hand in the work of those early days, and although as women we achieved no separate distinction, yet we flatter ourselves that we

played an important part in the building of the Canal."

It was in January, 1907, that, having perfected the machine that was to build the Panama Canal and started it going, Mr. Shonts reminded the President of his promise, made in April, 1905, that when the excavation of the cut between the Oceans was under full headway, the Chairman of the Second Isthmian Commission should be allowed to resign from the Government service. His conduct of Canal affairs, on the Isthmus and in Washington, had enhanced his previous reputation for capacity made in the railroad world before he went to Panama, and the financiers who were planning the combination of the subway, surface, and elevated railway systems of New York into the gigantic organization that now exists as the Interborough Metropolitan Company, knowing of Mr. Shonts' compact with Mr. Roosevelt, had requested him to accept the presidency of the proposed corporation. The position was one involving an infinitely greater demand on his peculiar genius as an organizer and executive than the mere digging of the Canal, now that the work was

begun, and in January, 1907, Mr. Shonts gave the President to understand that he was inclined to unite his fortunes with the new enterprise, and sent in his resignation as Chairman of the Isthmian Commission. Mr. Roosevelt's response was as follows:

"The White House,
"Washington, Jan. 22, 1907.

"MY DEAR MR. SHONTS:

"I accept your resignation as Chairman of the Isthmian Canal Commission, to take effect on March 4th, with extreme reluctance. I do so merely because I do not feel justified in preventing your acceptance of the position you have been asked to take in New York—a position of such great consequence not merely to the people with whom you will be associated in the business management of the enterprise, but to all the citizens of New York. You have shown throughout your association with the Isthmian Canal Commission such energy, administrative capacity, fertility of resource, and judgment in handling men, together with such entire devotion to your work, that I hardly know whether most to regret the fact that the National Government is to lose you, or most to congratulate those

who are to profit by your services in your new position.

"With all good wishes for your future, and with the heartiest thanks on behalf of the Government for what you have done in the last eighteen months, in the vitally responsible position you have held, believe me,

"Ever sincerely yours,

"THEODORE ROOSEVELT."

Mr. Shonts did not retire from the Canal organization until March, when he came to New York to assist in the solution of the rapid transit problem.

In the Foreword of this volume I have remarked that a misapprehension seems to exist, even among officials who ought to know better, as to the power vested in Mr. Shonts as Chairman of the Second Isthmian Commission, a power exactly the same as that held by Mr. Stevens and Colonel Goethals afterwards. Colonel Goethals himself evidently shares in this misapprehension, for in his address in Carnegie Hall last March, on the occasion of his being presented with the Civic Forum medal, he said: "President Roosevelt recognized the evils of a

seven-man government of Canal affairs and issued the order which centralized authority in my hands."

President Roosevelt had recognized the evils of a seven-man government of Canal affairs two years before Colonel Goethals' administration at Panama began, when authority was centralized in the hands of Mr. Shonts—as the records show. It was because he recognized the fact that the basic weakness of the First Isthmian Commission lay in the circumstance that each member considered himself personally responsible for every step taken toward the construction of the Canal, and for every dollar expended to that end, thus keeping the work back by never-ending controversies about minor details, that Mr. Roosevelt granted Mr. Shonts the absolute authority he demanded when he was made Chairman of the Second Commission. To have gone to Congress for legislation in the matter, however, would have been to risk complications and consequent delay, and the President and the Chairman of the Commission therefore worked out a scheme by which the seven-man form might be retained with one man in authority.

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Governor George W. Goethals
Chairman of the Third Canal Commission

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The Executive Order embodying this change of method was not issued until November 17, 1906, but it went into effect on April 1, 1905, the other six members of the Second Commission being given to understand by the President himself that Mr. Shonts was in supreme control. The order which established this state of affairs was worded as follows:

"In order to promote the greatest harmony between the heads of Departments, and to secure results by the most direct methods, the following organization shall be created:

"The organization shall consist of the Chairman and the following heads of Departments: Chief Engineer, General Counsel, Chief Sanitary Officer, General Purchasing Officer, General Auditor, Disbursing Officer, and Manager of Labor and Quarters. The duties of each shall be as follows:

"1. The Chairman shall have charge of all Departments, incident and necessary to the construction of the Canal or any of its accessories.

"2. He shall appoint the heads of the various Departments, subject to the approval of the Commission.

"3. The head of each Department shall

report to and receive instructions from the Chairman.

"4. He shall have charge of the operations of the Panama Railroad and steamship lines.

"5. He shall perform such other duties as may be assigned to him from time to time by the Secretary of War."

This order, with a subsequent minor amendment, is that under which Colonel Goethals completed the construction of the Canal, except that changes were made in the titles of the heads of departments to conform with military usage,[1] as is shown by the following letter from Taft to Mr. Roosevelt, dated January 5, 1908, when these trivial alterations were made:

"MY DEAR MR. PRESIDENT:

"I enclose herewith a form of Executive Order for your signature, defining the duties of the Isthmian Canal Commission, the duties of the

[1] Colonel Goethals outlined these changes in an address to the Canal employees at Corozal at the farewell reception to his predecessor, Chief Engineer Stevens, thus: "I will say that I expect to be the chief; the division engineers and the heads of the various departments are going to be the colonels, the foremen are going to be the captains, and the men who do the work are going to be the privates. You have your colonels with you and they will remain; you have your captains with you and they will remain."

Chairman of the Commission, and the duties of the Secretary of War in relation to Canal matters. This order makes substantially no change in the authority of the Commission, the Chairman and Secretary of War as now exercised, except perhaps in respect to a few duties of a detailed executive character which are transferred from the Commission to the Chairman, leaving the Commission still in general charge of the construction of the Canal, as provided by law. Canal matters have been conducted under previous Executive Orders with informal amendments from time to time which it is difficult for anyone not very familiar with the history of Canal matters either to find or understand. For this reason, it seems wise now to cover the matter by a new order which is not an amendment or a change except as to the unimportant details referred to, but merely a comprehensive revision of existing provisions."

It was the concentration of supreme authority in one man that has enabled Colonel Goethals, as head of the military régime at Panama, to carry on and complete in such manner as to command the wonder and admiration of the world, the work planned and begun under the railroad régime, as it enabled Mr. Shonts, en-

couraged by the unfailing support of President Roosevelt and sustained by the loyal coöperation of the other members of the Commission, to accomplish such vast results on the Isthmus in so short a time.

CHAPTER X

HUMAN MOSQUITOES

MR. SHONTS discovered soon after he accepted the chairmanship of the Isthmian Commission that there existed a mysterious and, seemingly, organized opposition to the construction of the Panama Canal, which went to pieces when its plans finally failed. Persistent efforts to bring into the light the heads of this conspiracy were unsuccessful. Secretary Bishop once got very close to them, but for reasons of his own he declined to assist in running them down. He told the Senate Committee on Appropriations in December, 1905, that just before he became connected with the Commission he was called upon by a man representing interests hostile to the Canal, having headquarters in Chicago and Washington, and including certain railways and the Nicaragua, Darien, and Tehuantepec routes across the Isthmus; and

that this man had offered him any salary he might mention provided he would take charge of a publication bureau to put out arguments against the construction of the Canal. Money was no object to these interests, their messenger had declared, and when Mr. Bishop asked just what their specific purpose was, the other had replied that it was "to create in Congress the impression that the Canal will never be built at Panama. We do not expect to defeat it," he said, "but we expect to delay it. That is all the object we have. We want to get such confusion in the mind of Congress about the possibility of building that Canal at Panama that they will withhold appropriations." Pressed for the name of this man, Mr. Bishop refused to say anything more about him than that he had come to him with a letter of introduction from a gentleman of reputation, whom the secretary did not wish to bring into the matter.

It was not, however, the organized opposition to the Canal so much as irresponsible writers in magazines and newspapers, who got their information from disappointed adventurers on the Isthmus, and returned incompetents from

the Canal Zone, that caused the greatest annoyance to the Commission. Attacks on the national project could not be ignored, for the reason set forth by the anti-Panama agent who had attempted to secure the services of Mr. Bishop. The money to build the Canal had to be voted by Congress, and if Senators and Representatives were led to believe that a waterway across the Isthmus of Panama was impracticable, or that the Canal-builders were incompetent or corrupt, appropriations would stop. Hence the energy with which the President, the Secretary of War, the Chairman of the Commission, and everyone connected with the Canal organization combated attacks upon the project from whatever source, and the thorough and painstaking measures they adopted to keep Congress informed as to actual conditions.

In November, 1905, Mr. Shonts told of the underground movement against the construction of the Canal, in an address he delivered before the American Hardware Association which was holding a convention in Washington.

"The Canal will be built—rest assured of that—and it will be built at Panama," he said.

"These two phases of the problem have passed irrevocably from the field of debate. There is an industrious and voluble band of hired Ananiases moving to and fro in the land whose mission it is to deny this. The burden of their song is: 'The Canal will never be built at Panama, and everybody connected with the enterprise, including the President, and Commissioners, and engineers, is convinced of it.' You can hear the members of this band chanting their song, to the accompaniment of their lyres, singly and in chorus, wherever men congregate, and wherever a few reporters are gathered together. They are rehearsing for their grand burst of noise when Congress shall have assembled. When they are not rehearsing, they are putting the words of their song into bogus interviews and other written forms of newspaper publication, which they are sending forth by thousands from their bureaus of publicity in this and other cities. As one contemplates the output of this singular industry, this factory of fiction, he is moved to say of its guiding spirit, as Shakespeare says of Captain Dumain: 'He will lie with such volubility, sir, that you would think truth were a fool.' Who is capitalizing this industry? What is the bountiful source of this spouting spring of mendacity? Is it to be found among the friends of an Isth-

mian Canal? Are these supplying funds for the sustenance of such a campaign of misinformation? What interests, except those foolishly dreading the competition of an Isthmian Canal, would put up money to delay and possibly defeat its construction? That there are interests of that kind is not a matter of suspicion or speculation, but of history. They have been fighting a canal for more than half a century and they fought it successfully till Theodore Roosevelt, armed with his 'big stick,' appeared as its champion. From that moment their efforts have been powerless, but they have not yet discovered the fact. They are wasting their energies and their cash, for behind Theodore Roosevelt stand the American people in solid mass and with determined front, shouting as one man: 'Give us a canal that will be adequate to meet the demands of the commerce of the world, and give it to us at the earliest possible moment.' That, gentlemen, is the command which the Commission, under the inspiring lead of the President, is obeying to the letter."

It was only a few weeks after Mr. Shonts had delivered this address—in January, 1906—that an article by Poultney Bigelow, entitled "Our Mismanagement in Panama," was published in

the New York *Independent.* It gave the people of the United States to understand that the reports of progress at Panama made by the Isthmian Commission, and in public addresses by Mr. Shonts, were false; that the work on the Canal was in the hands of corrupt politicians and practically at a standstill; that the West Indian negroes—by whom only, in Mr. Bigelow's opinion, the ditch could be dug—were quitting the job in disgust and returning to their homes, because they were lodged in swamps and badly fed and paid; and that general chaos existed on the Isthmus.

Mr. Bigelow's reputation was that of one of the ablest and most conscientious and accurate of American journalists, and hence his article was reproduced through the length and breadth of the United States. On this occasion it seems that he had spent only twenty-eight hours in the Canal Zone, during which period he interviewed two disgruntled white men, who had been snubbed by Canal officials; talked with colored brethren and sisters at random in the streets of Colon, and crossed the Isthmus and returned by rail.

It is a mystery to-day why a man of Mr. Bigelow's character should have put into print a tissue of falsehoods based upon mere hearing, for he is beyond suspicion of any pecuniary incitement in the matter. Indeed, it was shown that he had difficulty in securing the publication of the objectionable article, which he had offered to *Harper's Weekly* and *Collier's* before it was accepted by the *Independent.* However, it became necessary for the President, the Secretary of War, the Chairman of the Isthmian Commission, the chief engineer of the Canal, and the Governor of the Canal Zone to put aside other important and pressing duties and join forces in the preparation of a special message to Congress, in order to overcome the effects of the malice of two white "soreheads," plus their responsible gossip of unnamed blacks of both sexes, thus made of importance by Mr. Bigelow.

The two real authors of the major calumnies contained in the *Independent* article received dire chastisement at the hands of the Secretary of War, as witness the following extract from a letter by him to the President on January 8, 1906, and transmitted to Congress:

"The two witnesses whom we identify are Mr. Tracy Robinson and Mr. John Lundie, and I propose now to examine the impartiality and the freedom of bias of these witnesses:

"Mr. Tracy Robinson is the owner of property in Colon. I do not charge that the rents he collects are too high; I do not know. I am reliably informed that he is one of those who has raised his rents on the ground of improved conditions in Colon. He is, however, pecuniarily interested in having invested in Colon as much Government money as possible to improve his holdings in that city. He has lived forty years in Colon, and most of it when the town was in a condition far worse than it is now. His animus against the Government is because it devoted its first attention to the expenditure of money in Panama and thus raised the value of property in that city, and, secondly, that in the enforcement of the health regulations by the sanitary department in Colon he found it necessary to complain that his vested rights were being interfered with, although what he was required to do was only that he should observe the necessary rules of hygiene in his property. He is willing to have sanitary regulations enforced against his neighbors. Thirdly, Mr. Robinson applied to the former chairman of the Commission for an appointment with not less than $5000 a year

salary; was offered the mayoralty of Cristobal at $1800, but declined it with indignation as being unworthy his talent and social standing. He again applied to Governor Magoon for a position and was informed that there were no vacancies. Subsequently he asked to be made Superintendent of Schools of the Zone and was not appointed because Governor Magoon thought his age and temperament unfitted him for the position. Mr. Robinson is an elderly gentleman with nothing to do but to collect rents and to talk to strangers who visit his town, and is the source of many prejudiced reports against the Government coming from the Isthmus.

"The other witness whom we can identify is Mr. John Lundie, and in order to understand his impartiality in the criticism of the Government, I shall, at the risk of prolixity, give a little of Mr. Lundie's history. He is an electrical engineer. He was employed to visit the Isthmus in order to superintend the construction of a plant for the generation of electricity and the manufacture of ice by a private company. Under the treaty made with the Republic of Panama, it became the duty of the United States to construct a water supply and drainage for the city of Panama. The question for the Commission was where it could best secure a

proper supply of water in the quickest time and at the least expense. It found a reservoir, partly constructed, about eleven miles from Panama, immediately on the line of the railroad, and the water, when examined by experts, proved to be, and is, potable. It had the advantage of permitting the use of the right of way of the railway company clear from the reservoir to the city without expense. It permitted the use of the railway for the hauling of pipe and other material necessary in the construction of the waterworks, and the reservoir has now been completed, the pipe has been laid, and water flowed on the Fourth of July last. The water system now extends throughout the city of Panama. Before work was begun a syndicate of Panamanians desired that the water should be brought from a source some sixteen miles from Panama, far off the line of the railway. For this rival project it would have been necessary to condemn nearly all the right of way. The syndicate were interested in the property near where the water supply was and through which the pipe must be run. In their interest a series of articles appeared in a newspaper in Panama attacking the plan for the present water supply in the most vicious and denunciatory terms. These letters were written by Mr. John Lundie, whose assistance was invoked by the syndicate. I make

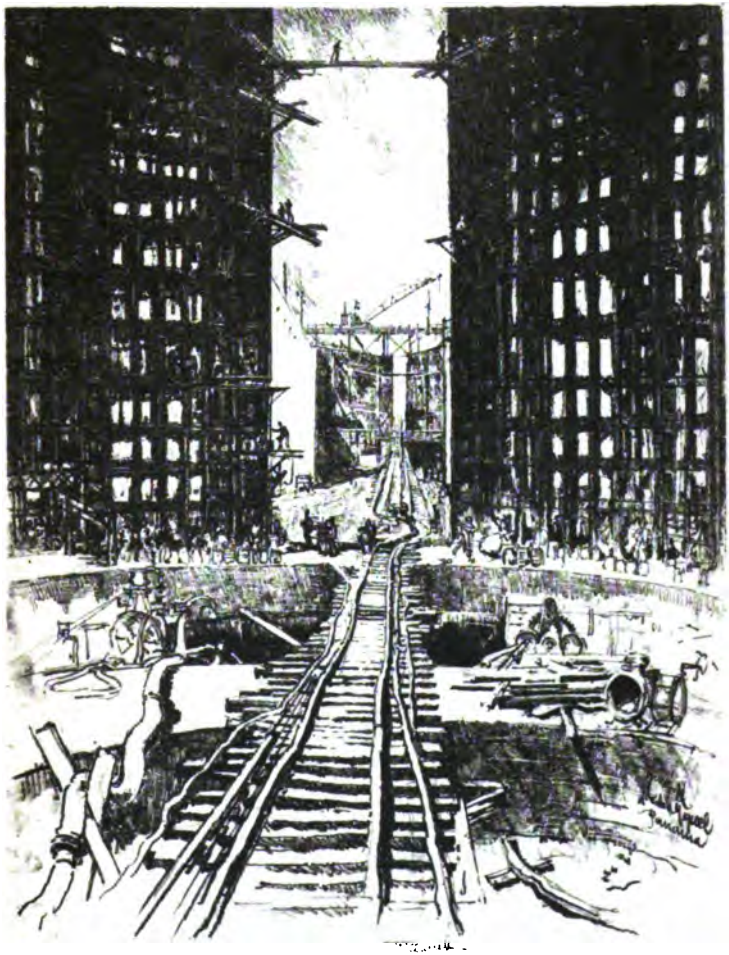
this statement on the authority of Gen. George W. Davis, then Governor of the Canal Zone.

"Subsequent to this, Mr. Lundie, having made his peace with Mr. Wallace, made formal application to become one of the advisory board of consulting engineers to report upon the proper type of canal. He did this avowedly because it would do him good in his business. Mr. Wallace good naturedly recommended him. Mr. Lundie visited me and urged his appointment with great vigor. He became so persistent in forwarding his own candidacy and so annoying in his importunities that, with your concurrence, I telegraphed to Mr. Wallace at the Isthmus to advise Mr. Lundie, who was then there, that his application for appointment was rejected chiefly on the ground of his undue and improper persistence in seeking a place of this character.

"Just as Mr. Wallace left the Isthmus he appointed this same Mr. John Lundie as consulting engineer, at a salary of $500 per month, to make a report of oils and fuels on the Isthmus, subject to the approval of the Chairman of the Commission. Mr. Wallace's action was disapproved by Mr. Shonts, and Mr. Lundie was not appointed.

"Mr. Lundie is the chief engineer of the ice and electric plant already referred to. It has a

capital of $250,000 which was furnished partly by Americans and partly by Panamanians. Mr. Lundie understands correctly that the Government expects to erect at Colon its own refrigerator plant, and that it proposes to furnish its own electric light. I believe that Mr. Lundie's company now derives some business from the Government. Mr. Lundie objects seriously to the Government's furnishing its own light and ice, and insists that it is its duty to patronize his company. It was to enter this protest that he wrote to me while I was on the Isthmus. When he found that his arguments upon this point were not thought to be weighty enough to prevent the Government from carrying out its plan, he wrote to you, Mr. President, a letter which exhibits the spleen and insolence of the man and the extent to which prejudice will carry him in making unfounded statements. I append this letter to you, together with his correspondence with me and with the Canal Commission. It is noteworthy in this connection that not only are the statements of fact contained in this letter repeated in the magazine article under discussion, but some of the reckless and impudent vocabulary of the letter appears in the article without change. This makes it quite certain that a copy of Lundie's letter to you was shown to the writer



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The Gates at Pedro Miguel

UNIVERSITY OF MICHIGAN

of the article. The writer's willingness to draw his facts from such a fountain of manifest malice, injured vanity, and disappointed ambition, as Lundie's letter, completely refutes his good faith in asserting his wish to find and state the truth.

"In the completion of the sewer system the plan carried a part of the sewer in Panama through property controlled by the company of which Mr. Lundie is the chief engineer and at present manager. He objected to the place where the pipe was to be put. The matter was brought to the attention of Chief Engineer Stevens, who went over the matter and insisted that their way was the proper way to go. Mr. Lundie conducted himself in such a way as to create a bitter personal difficulty with Mr. Stevens. The matter was then submitted to the Mayor of Panama, who, upon examination, determined that Mr. Stevens was right, and the pipe was laid in accordance with the views of the Government. This probably explains Mr. Lundie's views, filtered through the writer of the article, that no sewers are needed in Panama, and that the adopted plans are outrageously defective, and also the unfounded statement that the filth of sewerage has backed up in the city of Panama, and that the sewers as constructed do not discharge their proper function."

Mr. Lundie's letter to the President, referred to by Mr. Taft as exhibiting spleen and insolence, ran thus:

"JOHN LUNDIE, CONSULTING ENGINEER,
"52 BROADWAY, NEW YORK CITY.

"PANAMA, November 15, 1905.

"MY DEAR SIR:

"This letter, if you please, is not an official one to the President, but a private communication to Theodore Roosevelt, the man, whom every honest citizen must admire and honor for his sterling personal qualities.

"In my whole experience as an engineer and a business man (I am exactly your own age) I have never seen such a piece of mismanagement and utter demoralization as exists to-day on the Isthmus of Panama. The United States ought to hang its head in shame at the way in which prodigality, incompetence, insolence, unfair dealing (not to say graft, which is always hard to actually prove), and cowardice permeate the organization of the Canal Commission.

"The fault is not with the rank and file; there are many honest, competent men here. There is, however, every facility for them to become

dishonest and incompetent from laxity in organization.

"Please allow me to be very frank, even in criticizing those in high places, as their influence seems to permeate the whole organization and makes ridiculous men of the highest integrity or business and professional reputation who happen to come under their influence or supervision.

"I understand Secretary Taft arrived on the Isthmus on November 2, and left on the 7th. What was talked over in Panama Government circles and with the Executive Officers of the Commission it would be impertinence for me to discuss. I asked the gentleman for a conference in person and wrote him a letter, to which I received a reply, a copy of which is inclosed with a business communication addressed to you. The reply is a simple turning off of the question involved,—a 'Go away, little boy' response. As to a conference, he had time for a great deal of social entertainment, which perhaps, for aught I know, fulfilled the diplomatic object of his visit. He attended, for instance, receptions and balls (yes! he danced, to the intense amusement of the tittering girls of Panama) on Friday, November 3, and Sunday, November 5, in Panama, and on Monday, November 6, in Colon. Nero fiddled while Rome burned.

"The members of the Commission and the

advisory board arrived at Colon on Wednesday, October 4. Their itinerary was as follows:

"Wednesday, October 4. Special train from Colon to La Boca and return, avoiding the pest-ridden (ha!) city of Panama—all dressed like guys, with white helmets—for ostensibly the purpose of getting a general view of the country.

"Thursday, October 5. Visited site of proposed dam at Bohio on train. There is the best of authority for stating that only one of the party walked as far as the water's edge.

"Friday, October 6. Visited site of proposed dam, Gamboa.

"Saturday, October 7. Visited Culebra cut. Some of the party actually refused to walk through the cut.

"Sunday, October 8. Day of rest!

"Monday, October 9. Visited city of Panama for a few hours and paid respects to President Amador.

"Tuesday, October 10. Received Canal officers at Colon.

"Wednesday, October 11. The cowards sailed away.

"The foregoing refers to the advisory board. The Commission no doubt met in solid deliberation behind mosquito screens.

"During their stay they lived aboard the steamship *Havana*. They did not dare take

trips which would necessitate remaining away from their fan-cooled rooms over night. Not a member of the board of engineers, I understand, went to Alhajuela. One Congressional Representative had the nerve, I believe, to make the trip.

"Their actions are beyond comprehension. All honorable professional (save the mark of some) gentlemen. They might as well have stayed at home and studied the data furnished in book form, except for the fact that, to their mental vision, they have now some idea of the country to which the data refers. They were certainly induced by someone, or by reports, to act like a lot of scared cats. Personally I saw none of them, but the descriptions of the cowardice displayed are screamingly funny. I am sure any ordinary business man in Congress would be able to knock their 'academic' report into a cocked hat, if their visit to the Isthmus is the basis of their conclusions. It looks as though this idiotic yellow-fever bugaboo is being used to advantage by someone.

"There is a coarse, incompetent, unprincipled jackass by the name of Shonts, who, under the Secretary of War, seems to dictate the physical and moral tone of what is done on the Isthmus, and the result is pitiful in the extreme. The United States will, under such influence, become

the laughing stock and stink in the nostrils of the whole world. His appointees are of varied stripe, but mostly take after their patron. High salaries do not, of necessity, make big men out of incompetent weaklings (or worse).

"Governor Magoon seems to stand the light of criticism well, appearing to be a man of suavity and integrity. He, however, seems to wish to please the 'men higher up,' to the distortion of his better sense of right and justice.

"Under the present régime the Canal project will become, assuredly, a seething mass of corruption.

"Please take this letter as a confidential communication for your own use. I have no public charges to make, nor is my aim in writing to you to seek any public preferment. My experience in seeking an appointment on the advisory board of engineers was my first, and it will be my last effort to seek public office. Men of my stamp are evidently not wanted. I propose to stand or fall on my personal merits, sticking to private business, but will endeavor to hit a head, when I see it, of a corrupt or incompetent public official.

"Assuredly, sir, it would seem as though the day of the upright, fearless, competent man is giving way to a reign of cupidity and utter lack of moral sense.

"The man in the White House is beyond reproach. Why such lieutenants?

"It is trusted that you will even stand alone, if necessary, in fighting for the honor of the United States. You will not, however, have to do so, as there is enough of the sterling stuff sweeping miserable time-servers into oblivion, so far as such lies in your power.

"Yours most sincerely,

"JOHN LUNDIE.

"HON. THEODORE ROOSEVELT,
"WASHINGTON, D. C."

Mr. Lundie's resignation from the American Society of Engineers was accepted soon after the publication of this letter.

Mr. Bigelow did not go unscathed for his part in the dissemination of the slanders of Messrs. Tracy, Lundie, and the others. Two weeks after his article appeared in the *Independent*, he was summoned before the Committee on Inter-oceanic Canals of the Senate. He was under the impression that his opinion as to the situation at Panama was desired by reason of the fact, as he explained to the Chairman, that he had "made a study of labor conditions in the tropics under fairly cognate circumstances."

Mr. Bigelow was informed, however, by the late Senator Morgan, that he was before the Committee for cross-examination about the *Independent* article.

"That is the proposition," said the grim old legislator, "and I think Mr. Bigelow ought to have every proper opportunity to inform the Committee of the sources of his information and the character of his information, so that the Committee can determine whether Mr. Bigelow has told the truth in his article in the *Independent*. That is my understanding of the purpose of his being here. I would like to remark, also, that I see no purpose connected with Mr. Bigelow's examination that has any possible advantage in it for the construction of a canal. I am interested in the construction of a canal, and I am not interested in the gossip or the opinions of men who circulate about that place or other places for the purpose of making graphic or sensational statements on this question. They have no weight and ought to have no weight with the Committee. We have to investigate the facts ourselves."

Mr. Bigelow proved a stubborn and unsatis-

factory witness with regard to the truth of his article on canal "mismanagement," evading many questions and declining to answer others on the ground that his information was confidential, and attempting learned disquisitions on minor points of inquiry. He further complicated matters on the question of his own veracity, by volunteering the statement, when reminded that the Committee wanted only facts from him: "Here is a fact—the fact that many engineers of distinction have declined the offer of the Government to take charge of the work on the Canal," and then being able to name but one engineer who had thus "declined the offer"—who, it transpired afterward, had never received it.

At one point during Mr. Bigelow's examination he endeavored to dignify his unfortunate position by making it appear that there had been a controversy between himself and the Secretary of War as to conditions at Panama, upon which issue the following extract from the record bears:

"Senator Simmons. Mr. Chairman, so far as I am concerned, I do not care anything about the controversy between Mr. Bigelow and Mr.

Taft or Mr. Stevens. I want to know what he saw down there.

"The Chairman. That is what we want to know, Mr. Bigelow—what you saw during the time you were at Panama.

"Senator Simmons. And I want to know why he accepted certain statements that he put in this article as true, that the Committee may determine whether those statements are reliable or not.

"Senator Hopkins. And I wish, Mr. Chairman, to disclaim on the part of the Secretary of War that there is any controversy between him and this gentleman.

"The Chairman. I have not understood that there was.

"Senator Hopkins. There is no controversy. This gentleman has written an article relating to the condition in Colon. He is called here to give the facts relating to the matter, so that we can make a more thorough investigation than his article would warrant. Instead of doing that, he has broken off and made a statement here regarding a number of eminent engineers, as he claims, who have declined service for specific reasons enumerated by him. I insist that the witness, after going that far, shall be compelled to give the names of those men. The Committee is entitled to it and the public is entitled

to it. No man should be permitted to make a general statement of that kind without furnishing the information that will enable us to either contradict or confirm his statement."

Mr. Bigelow still continued his refusal to give authorities, either for the information contained in the *Independent* article, or for his statement with regard to the engineers of distinction who had declined the Government's offer to take charge of the work on the Canal; and, after Senator Morgan had warned him that his conduct made him amenable to the criminal courts of the District of Columbia, he was dismissed from the witness stand. The Senate did not consider it worth while to carry the matter any further, however.

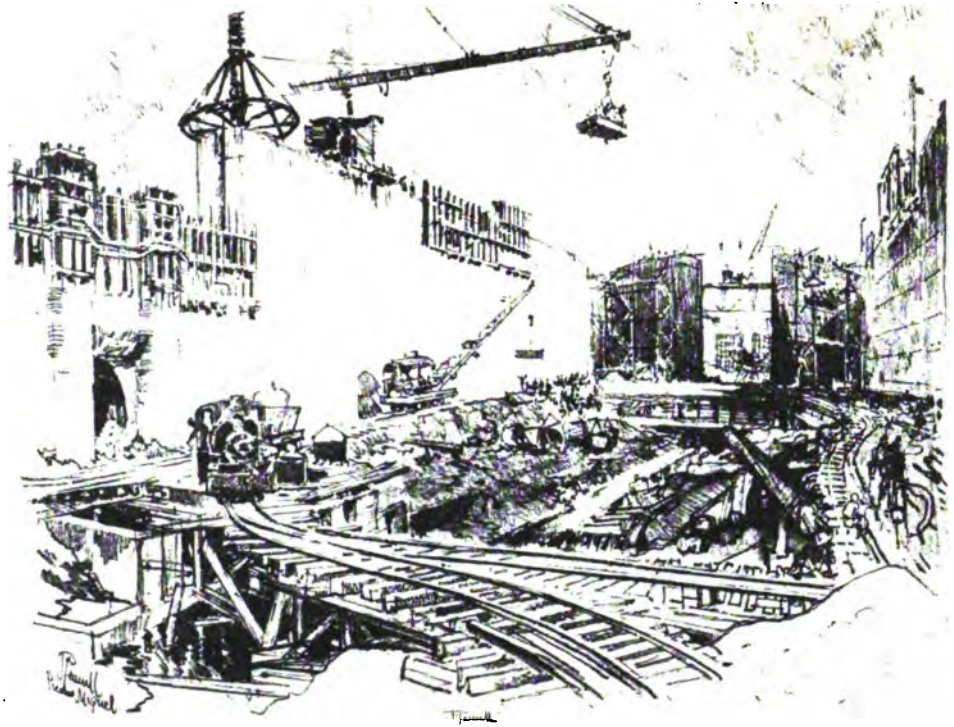
It was only two weeks after Mr. Shonts delivered the address already referred to before the hardware men in Washington that a New York newspaper which, for some unknown reason, was opposed to the adoption of Panama as the route of the Isthmian Canal, and which persistently expressed that position during the time that the country was in debate on the matter, devoted two columns to an article under head-

lines running thus: "Clergy Raise Moral Issue on Isthmus—Importation by Canal Officials of Negro Women Raises Storm of Protest—Ministers Will Make an Appeal,—They Will Urge that the Bringing in of Women be Stopped at Once," which conveyed the impression, as it was afterward formulated on the floor of the Senate, that "a cargo of women had been brought to Colon, under the authority of the Canal Commission, to be distributed up and down among the laborers on the Isthmus for immoral purposes."

On this occasion the Canal officials had learned of the nature of the newspaper article before it appeared, and were prepared for its immediate refutation. Nevertheless, the investigation required lengthy correspondence by cable and mail, and meant unnecessary work for the President, the Secretary of War, the Chairman of the Commission, and the Governor and chief of police of the Canal Zone; and, although the facts in the matter had been cabled by Governor Magoon to Mr. Shonts, who was in Washington, on November 20th, while the article did not appear until November 25th, it received wide circulation, eminent moralists in and out of

the National Legislature and the pulpit being unduly agitated before the lie was nailed. Governor Magoon's statement of the facts on which the newspaper sensation was builded was based on a report made to him by Chief Engineer Stevens, which in turn was founded on one made by Chief of Police Shanton. "These women consist largely of the wives of laborers who had preceded them, coming to our work," telegraphed the Governor to Mr. Shonts, "and were sent here on the request of their husbands, some coming to fill positions as servants in white families and some as laundresses and chambermaids, for which there was a demand; and all were brought with only the above objects in view, precisely as white women have come from the States under similar conditions to join their husbands and as nurses, etc. Nearly every one of these families was known personally to our representative in Martinique, and care was taken to include only those who came for legitimate purposes, and to my belief the selection was justified by the results. You can hear any sort of a rumor on the Isthmus, and the one you referred to is entitled to just as

much credence as any of them—none at all. At the same time it must be borne in mind that the situation as regards social and family relations among the island blacks differs entirely from that which obtains among white people generally. Thousands of men and women in these islands live together their lives long and never go through the marriage ceremony, but they are recognized as man and wife, and all their family relations are based upon the above arrangement. In fact, the proportion of illegitimate children (illegitimate according to our standard) in some of the largest and most populous islands is 80 per cent. Still, the families so constituted form the unit of the social and political life of the islands, and from their point of view, from which it is entirely proper to judge them, are entitled to just as much respect as our people who happen to be born and live in another country and under different conditions. You can absolutely and unqualifiedly deny any other purpose in bringing these women to the Isthmus excepting an absolutely legitimate and honest one. Our effort is to establish our blacks as well as whites in old home relations, so that a



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The Walls of Pedro Miguel

feeling of stability and contentment with consequent better work will result."

Chief of Police Shanton made a thorough canvas of the 295 women who had been brought from Martinique to the Isthmus. His report showed that 126 of them were married and living with their husbands; 36 were in domestic service, 48 employed as servants in the Isthmian Commission hotels, 24 working in the Commission's laundries, 51 living with unmarried men, under the same conditions as in their native country, while 10 were unemployed. "As a class," the Chief of Police reported, "these women are neat, clean, and industrious, and the records of this department show that none of them has been arrested for any cause whatever." Most of the women were from 30 to 50 years old, few being under 30, at which age a woman may be called elderly in the Tropics. They had been selected from more than 1500 who presented themselves to the Isthmian Commission's labor agent at Martinique, who satisfied himself that each woman had a natural protector working on the Canal, either a husband, father, brother, or sister, before permitting her to take the trip

to Panama. The neutralizing of the poison disseminated by the mosquito who gave birth to the Martinique women canard—if I may be permitted to take more than one liberty with metaphor in the same sentence—involved a long report by the Secretary of War to the President; correspondence between the Secretary and Senator Lodge and between Mr. Shonts and Senator Allison; and the examination by the Secretary of Chief Engineer Stevens and J. W. Settoon, the agent of the Canal at Martinique, (the latter coming all the way to Washington for that purpose), aside from the investigation on the Isthmus and the letters and cables exchanged between Mr. Shonts and Governor Magoon. Nor should the anguish of pious souls in the United States, over the vision of sin at Panama, which they were forced to contemplate for many days before the real facts transpired, be forgotten.

Mr. Bigelow commented on the Martinique women episode in his *Independent* article. "The correspondent of the New York *Herald* at the Isthmus is an ornament to his difficult and honorable calling," Mr. Bigelow opined, "and his

letter of November 18th, which arrived in time to flavor the Thanksgiving sermons of many American pulpits, is a document which our Washington officials should occasionally refer to when preparing an address on the elevating influences of American rule over alien races."

In October, 1905, before the *Herald* or the *Independent* sprang their sensations, the American newspapers had published dispatches from Panama, holding up the Canal Zone police to the public gaze as a band of ruffians. The true story of the affair was told in the following cable from Governor Magoon to Mr. Shonts:

"French steamer *Versailles* arrived Colon Harbor Saturday, September 30, with 579 passengers from Martinique and 300 Colombians destined for work on Canal. Panama health regulations require immigrants to be vaccinated. Two hundred Martiniques refused and remained on vessel, declaring they must be given free return to Martinique. Agent steamship line appealed the French Consul for assistance in inducing them to land. Consul persuaded 75 to be vaccinated, but his efforts with remainder counteracted by voodoo doctor. Consul then requested Panama police to assist ship's officers

in relieving vessel. It is customary for the Zone police stationed at Cristobal to assist Colon police in handling crowds of passengers going from docks to railway train, and chief of Colon police called on Zone police officer at Cristobal for the usual assistance. A sergeant and eight policemen went to dock. Shortly after their arrival the men came off the ship with a rush, seeking to avoid vaccination by getting away. In checking the rush the Panama and Zone police used their clubs. No one was seriously injured. The men were vaccinated and taken to Corozal, and all but one are at work to-day."

On this occasion it was necessary for the State Department to make representations to the French Vice-Consul in charge at Colon, since the alleged victims of police brutality had arrived on a French steamer, and there was also an investigator on the Isthmus, involving correspondence between Secretary Taft, Mr. Shonts, and Governor Magoon.

Aside from manufactured sensations, some newspapers discouraged the work of the Canal-builders in editorial articles and correspondence from the capital, making no direct accusations

for fear of libel suits, but insinuating that graft and incompetency were rife at Panama, and that investigation would show up the members of the Isthmian Commission as a set of rascals. A typical article of this nature appeared in the New York *Herald* of January 1, 1906, announcing in a dispatch from Washington that Congress was to make an investigation, as follows:

"The Spooner law gave the President the widest latitude in spending money. The President took the responsibility. Perhaps he fell into a trap. Most men would have hesitated about accepting it. Not so Mr. Roosevelt. He was so eager to have the credit in history of having constructed the Canal that he leaped into the ditch, so to speak, and a fine opportunity is now open to Congress.

"The 'lid' is to be taken off at Panama, all the expenditures are to be uncovered. If the men acting as agents of the President have been prodigal with the money of the United States Government, the President and his Secretary of War, in whom he vested supreme authority, are answerable. Yet while most of this money was being expended and things yet to be exposed in Congress were being done,

the President was resting at Oyster Bay, and his Secretary of War was on the other side of the world, conducting a tour of statesmen to the Philippines.

"The most vivid flashlight let in on the Panama situation is that Mr. Root has been called in to give advice as to the nature of the statement which shall be made to Congress. The unrest over the outlook has been growing ever since it became known that Senators were busily engaged in inquiring about certain important purchases by the Canal Commission and into the manner in which these purchases were made. Indeed, the report in Washington is that the friends of Mr. Roosevelt are of the opinion that it will be necessary to throw responsibility upon subordinates and to say many things were done without his knowledge. This is what the Senate would like to have the President do, because it would enable the enemies of the Administration to point to this as an example of incapacity. Panama matters may be satisfactorily explained, and if anyone can get out of an awkward position Mr. Roosevelt can."

On the publication of the President's message to Congress, which conclusively proved Mr. Bigelow's article in the *Independent* to be

altogether unworthy of credence or respect, the *Herald* printed another dispatch from Washington, calculated to lead those who had not read the documentary evidence in the case to believe that it cast discredit upon the Isthmian Commission. The dispatch ran thus:

"Chairman Shonts of the Canal Commission was very emphatic to-day in his declaration that he would not resign because of anything Secretary Taft said in his letter to the President accompanying the report of the Commission."

As Secretary Taft's letter upheld Mr. Shonts' conduct of affairs in the Canal Zone in every particular, it may be left to the reader to decide what was the object of the *Herald* in endeavoring to lead the public to believe that he had been censured. On the same day that this misleading and dishonest dispatch appeared in the *Herald* that newspaper also published the following editorial:

"The Englishman who, arriving in a Mexican port December 31, 1879, and sailing on January 1, 1880, wrote a book on 'Mexico in '79 & '80,'

is recalled by Secretary Taft's statement that the writer of a recent voluminous criticism on Canal affairs arrived on the Isthmus on November 30th and sailed the following day.

"Sensitiveness to comment upon canal affairs, however, is betrayed in this ponderous reply to a condemnatory article at a time when two Committees of Congress are to undertake an exhaustive investigation of the whole subject. One is tempted to ask why Secretary Taft has not attempted to refute other and more deliberate charges of mismanagement on the Isthmus.

"The *Herald's* special correspondence has chronicled the paralyzing congestion of traffic as well as the disgraceful unsanitary conditions of Colon and the importation of a shipload of negro women, who by no means were the 'wives of workmen' as asserted. At any rate on the eve of a rigid investigation of the entire position on the Isthmus, the long and elated explanation of Secretary Taft would seem superfluous."

As the very document upon which the *Herald's* editorial was based absolutely refuted both the charge with regard to "disgraceful unsanitary conditions" at Colon, and that of the importation of women into Panama for immoral purposes, the obvious inference is that the writer

of the article either had not read the report he criticized, or that he had some reason for willfully and maliciously perverting the facts in the matter. It may be remarked that at that period the congestion of traffic on the Panama Railroad was being rapidly overcome.

The *Herald's* articles are typical of those that appeared in other newspapers during the railroad régime at Panama. They are scarcely worthy of notice so long afterwards, except as they show what nuisances the human mosquitoes were to the earlier canal-builders,[1] the more particularly in view of the circumstance that all the world knows to-day that the history of the Panama Canal is one of administrative

[1] Since writing this chapter I have been shown a letter written by a Canal employee to a friend in New York in April, 1906,—in which he perhaps confounds a part of the American press with the American people,—thus indicating of the effect produced on the workers in Panama by unfounded criticism at home. "I enjoyed Mrs. —— [his wife's] visit, although it was very short," wrote this employee, "and know that she goes back with the determination to return to the Isthmus, believing that it is something of a health resort. As a matter of fact, I do not think there is a place on the face of the globe that has been more lied about than the Isthmus of Panama. But the American people don't want to believe anything good of it, or of those who see fit to undertake the battles down here. However, we are going ahead regardless, and making a name that we have no reason to be ashamed of."

triumph from the advent of the Second Isthmian Commission to the completion of the work, and that in spite of the fact that nearly $400,000,000 has been spent in its construction there has been but one charge of grafting made against an official and that long after the railroad régime ended.[1]

How the newspaper attacks upon the Canal builders reacted upon the public mind may be learned from an account of the gossip on ship and shore at Panama and on the way, furnished by Lindsay Denison, who went to the Isthmus for *Everybody's Magazine* in February, 1906, with a letter from President Roosevelt giving instructions to every Government official and employee in the Canal Zone to show the journalistic investigator everything that was going on there, whether it reflected upon Mr. Shonts' administration or not. "For fourteen days, sailing down the West Central American coast," wrote Mr. Denison, "we had listened at table and in the smoking-room, as well as in coffee-factors' offices, hotel courts, and on street

[1] See Appendix, page 400, "President Roosevelt's Endorsement of the Railroad Men."

corners ashore, to grisly, slimy tales of scandal at Panama. The climate was deadly as that of the S. P. C. A. dog-killing chamber; the Isthmus was full of yellow fever concealed by the United States hospital authorities; the fumigation squad of the sanitary department was an incendiary band which went about deliberately carrying out a plan to set fire to the cities of Panama and Colon and thus wipe them off the map; at Panama the American-built waterworks were full of sewage, at Colon they had gone dry; the Zone police were a band of negro cut-throats, who were likely to rise up at any moment and massacre every white man on the Isthmus; graft was everywhere; every member of the Isthmian Canal Commission was 'getting his bit'; the pay of laborers was being held back purposely so that the paymasters might force from the helpless Jamaicans a liberal rebate in consideration of being paid at all; food little better than swill was being served to the Americans in the Isthmian Commission's eating-houses to the tremendous profit of the commissary officers; disabled steam-shovels were lying idle along the railroad all across the Isthmus, while

the engineers and their subordinates reveled vinously in the Panama brothels, shouting: 'It's Government money, so who cares'; the Panama Railroad was a thief-ridden trail of inefficiency from Panama to Colon; inter-Oceanic freight was piled mountains high at either terminal. We prepared to hold our noses and go across on the run.

"'Why, gentlemen,' said one of the most informing of our fellow voyagers, 'you see that there are no vultures hanging over Panama; vultures would starve to death here; their human competitors have skinned the land.'"

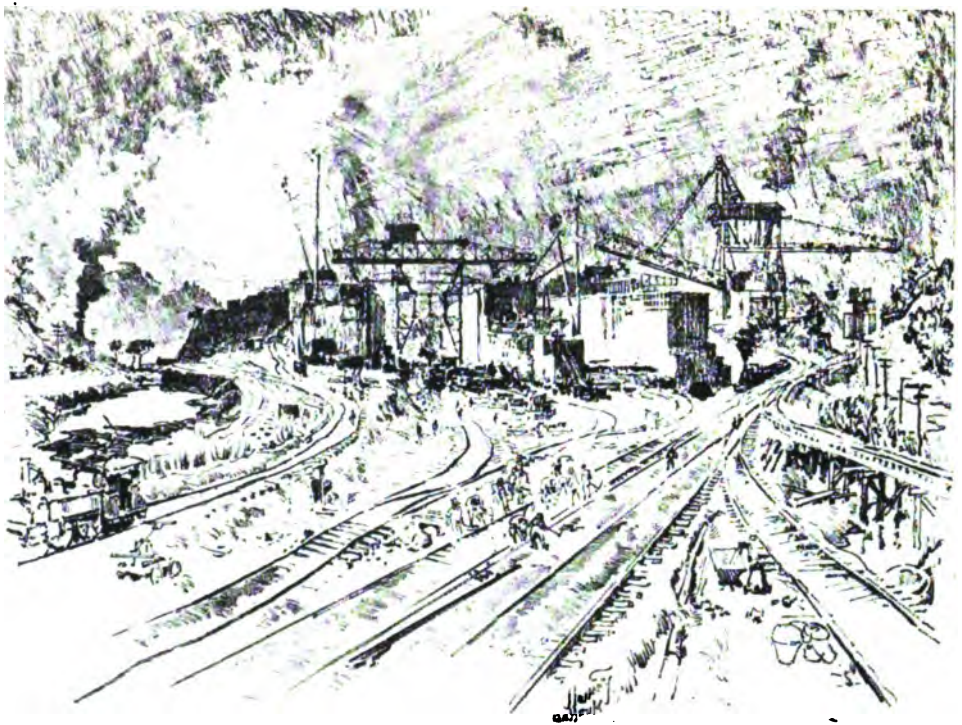
Mr. Denison's article, which was published in the May issue of his magazine, was on the whole a fair presentation of conditions on the Isthmus at the time of his visit, but, as a trained observer, he could not, of course, fail to notice mistakes in the conduct of affairs that were obvious of themselves. Thus, writing of the Panama Railroad, he remarked sagely: "I have yet to find out why cement belonging to the Commission and coffee in transit to Europe from the west coast should be exposed to rain on flat cars, while railroad ties are painstakingly stowed in box

cars." Had Mr. Denison's amazement at this extraordinary spectacle not prevented his making inquiry of the nearest railway hand, he might have been informed that so great was the congestion of traffic that no cars, flat or enclosed, were allowed to run empty: wherefore, there being railroad ties from Oregon at the west terminus of the road to be shipped eastward and empty box cars at the same point bound in that direction, the ties were sent by them. Similarly if a flat car was unloaded at a point where there was cement or coffee, or anything else, to be shipped in the direction the empty flat cars were going, it was loaded onto the flats and sent on its way. Anyone of the railroad hands would have further informed the journalist that it does not injure railroad ties to be carried under cover, and that, when there was rain, the coffee and cement on the flat cars were covered with tarpaulins, several thousand of which were shipped to Panama for that purpose during the early part of the railroad régime.

It may be mentioned that so sensitive was President Roosevelt to criticism of the conduct of affairs on the Canal Zone, that on reading the

article in *Everybody's Magazine* he cabled an inquiry to the superintendent of the Panama Railroad, as to his reasons for transporting freight in the manner deprecated by Mr. Denison, to which message he received a tranquilizing reply.

While Mr. Bierd, as superintendent of the Panama Railroad, was awaiting material for the reconstruction of the line, Mr. Shonts assigned to him the duty of unloading two shiploads of timber from Oregon—a part of a 5,000,000-foot order—that lay one and a quarter miles from the Panama terminus of the railroad on the Pacific Ocean, and could come no closer without danger of grounding. For the sixty years that the Panama Railroad has been in the carrying trade, all freight has been lightered in, in lighters of six-foot draft, from one to three miles from shore to what is now Balboa, then called La Boca, the Pacific terminus of the road, where cargoes were transferred from ships to cars, and vice versa, for the run across the Isthmus. Under this system, vessels, whose depth of draft did not prevent, lay under the lee of Naos Island, one and one half miles from shore, where the railroad had



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Early Morning Miraflores

UNIV OF MICH

built shelters for its laborers, who went to and fro in rowboats. The mean tide at this point is twenty-two and one half feet, and the French had done enough dredging to bring merchandise ships of from sixteen to twenty-two feet draft to La Boca, when the tide was at its height. These ships were allowed to ground when the tide went out, and loading and unloading was done under difficulties.

The two timber-laden ships, of deep draft, sailed under English register and were underwritten at Lloyd's; under the terms of their insurance they were obliged to lie afloat at all times, or the insurance was invalidated. The timber with which they were loaded was for bridge and dock construction, and was brought in in two sizes, a foot square and twelve by eighteen inches, the largest turned out, to be worked up into anything from planking to joists. Mr. Bierd realized that to unload this timber more than a mile from shore, since it could not be lightered in, would be to run the risk of heavy loss in the event of a storm. He therefore went through the form of asking their masters if they would bring the ships in with the tide, grounding them

as close inshore as possible; and, receiving the negative reply he had anticipated, cabled to the English owners offering to assume their insurance on behalf of the United States Government, if they would allow the vessels to be grounded for unloading. It required eleven days to go through the necessary formalities, and then the ships were grounded one thousand feet from shore. Piles and anchor chains were now procured, and four large rafts constructed, onto which the timber was unloaded by the use of the ships' derricks when the tide was out, to be floated in with the rising tide and packed ashore by negroes. Two more shiploads of timber were unloaded in the same manner, a labor of some two months. It is not to be wondered at that a few pieces of timber were lost in the course of unloading some hundreds of thousand feet. Perhaps it is not to be wondered at either that the fact gave rise to reports that millions of feet of lumber were being encouraged to float out to sea, so that more might be bought, to the profit of grafting members of the Canal Commission and lumber dealers.

President Roosevelt took an effectual method

of silencing the enemies of the Canal, and the slanderers of the canal-builders, when, in December, 1906, he sent a special message to Congress presenting the results of his three-day visit to the Isthmus the previous month, and proving his statements as to the progress of the work accomplished by appending no less than twenty-five photographs, each measuring 10 by 7½ inches, taken at Panama under his supervision. It was the first time a President of the United States had ever sent an illustrated mesage to Congress; and, while both Houses were somewhat aghast at the innovation, it accomplished its purpose. Mr. Roosevelt's references to the human mosquitoes are contained in the following extracts from the document that enlightened legislators and the public:

"Corozal, some four miles from La Boca, was formerly one of the most unsanitary places on the Isthmus, probably the most unsanitary. There was a marsh with a pond in the middle. Doctor Gorgas had both the marsh and pond drained and the brush cleared off, so that now, when I went over the ground, it appeared like a smooth meadow intersected by drainage ditches.

The breeding places and sheltering spots of the dangerous mosquitoes had been completely destroyed. The result is that Corozal for the last six months (like La Boca, which formerly also had a very unsanitary record) shows one of the best sick rates in the Zone, having less than one per cent. a week admitted to the hospital. At Corozal there is a big hotel filled with employees of the Isthmian Canal Commission, some of them with their wives and families. Yet this healthy and attractive spot was stigmatized as a 'hog wallow'[1] by one of the least scrupulous and most foolish of the professional scandal-mongers who from time to time have written about the Commission's work. . . .

"I visited the Mount Hope reservoir. It is a lake over a mile long and half a mile broad. I forward herewith a photograph of this lake, together with certain other photographs of what I saw while I was on the Isthmus. Nothing but a cataclysm will hereafter render it necessary in the dry season to haul water for the use of Colon and Cristobal. One of the most amusing (as well as dishonest) attacks made upon the Commission was in connection with this reservoir. The writer in question usually confined himself to vague general mendacity; but in this case

[1] It was Poultney Bigelow who likened Corozal to a hog wallow.

he specifically stated that there was no water in the vicinity fit for a reservoir (I drank it, and it was excellent), and that this particular reservoir would never hold water anyway. Accompanying this message, as I have said above, is a photograph of the reservoir as I myself saw it, and as it has been in existence ever since the article in question was published. With typical American humor, the engineering corps still at work at the reservoir have christened a large boat which is now used on the reservoir by the name of the individual who thus denied the possibility of the reservoir's existence.[1]

"My examination tended to show that some of the departments had (doubtless necessarily) become overdeveloped, and could now be reduced or subordinated without impairment of efficiency and with a saving of cost. The Chairman of the Commission, Mr. Shonts, has all matters of this kind constantly in view, and is now reorganizing the government of the Zone, so as to make the form of administration both more flexible and less expensive, subordinating everything to direct efficiency with a view to the work of the Canal Commission. . . .

"It is not only natural, but inevitable, that a work as gigantic as this which has been under-

[1] The boat was named Poultney Bigelow.

taken on the Isthmus should arouse every species of hostility and criticism. The conditions are so new and so trying, and the work so vast, that it would be absolutely out of the question that mistakes should not be made. Checks will occur. Unforeseen difficulties will arise. From time to time seemingly well-settled plans will have to be changed. At present 25,000 men are engaged on the task. After a while the number will be doubled. In such a multitude it is inevitable that there should be here and there a scoundrel. Very many of the poorer class of laborers lack the mental development to protect themselves against either the rascality of others or their own folly, and it is not possible for human wisdom to devise a plan by which they can invariably be protected. In a place which has been for ages a by-word for unhealthfulness, and with so large a congregation of strangers suddenly put down and set to hard work, there will now and then be outbreaks of disease.

"There will now and then be shortcomings in administration; there will be unlooked-for accidents, to delay the excavation of the cut, or the building of the dams and locks. Each such incident will be entirely natural, and, even though serious, no one of them will mean more than a little extra delay or trouble. Yet each,

when discovered by sensation mongers and retailed to timid folk of little faith, will serve as an excuse for the belief that the whole work is being badly managed. Experiments will continually be tried in housing, in hygiene, in street repairing, in dredging, and in digging earth and rock. Now and then an experiment will be a failure; and among those who hear of it, a certain proportion of doubting Thomases will at once believe that the whole work is a failure. Doubtless here and there some minor rascality will be uncovered; but as to this, I have to say that after the most painstaking inquiry I have been unable to find a single reputable person who had so much as heard of any serious accusations affecting the honesty of the Commission or of any responsible officer under it. I append a letter dealing with the most serious charge, that of its ownership of lots in Colon; the charge was not advanced by a reputable man, and is utterly baseless. It is not too much to say *that the whole atmosphere of the Commission breathes honesty as it breathes efficiency and energy.* Above all, the work has been kept absolutely clear of politics. I have never heard even a suggestion of spoils politics in connection with it.

"I have investigated every complaint brought to me for which there seemed to be any shadow

of foundation. In two or three cases, all of which I have indicated in the course of this message, I came to the conclusion that there was foundation for the complaint, and that the methods of the Commission in the respect complained of could be bettered. In the other instances the complaints proved absolutely baseless, save in two or three instances where they referred to mistakes, which the Commission had already itself found out and corrected.

"So much for honest criticism. There remains an immense amount of as reckless slander as has ever been published. Where the slanderers are of foreign origin I have no concern with them. Where they are Americans, I feel for them the heartiest contempt and indignation; because, in a spirit of wanton dishonesty and malice, they are trying to interfere with, and hamper the execution of, the greatest work of the kind ever attempted, and are seeking to bring to naught the efforts of their countrymen to put to the credit of America one of the giant feats of the ages. The outrageous accusations of these slanderers constitute a gross libel upon a body of public servants who, for trained intelligence, expert ability, high character, and devotion to duty, have never been excelled anywhere. *There is not a man among those directing the work on the Isthmus who has obtained his position on*

any other basis than merit alone, and not one who has used his position in any way for his own personal or pecuniary advantage."

Since Mr. Roosevelt's special message to Congress in December, 1906, there has been little adverse criticism of the conduct of affairs in the Canal Zone, although in the summer of 1908, he found it necessary to send Mr. Taft, then President-elect, with a board of seven engineering experts, to the Isthmus, to investigate a report sent from Panama by a newspaper correspondent to the effect that the Gatun dam had collapsed, and this in spite of the fact that there was at the time no dam there to collapse.

From this it may be seen how exactly parallel to the activities of the mosquito in disseminating disease have been the ignorant or dishonest performances of journalists in creating doubt, suspicion, and trouble in connection with the Panama Canal affairs.

Just as the former alights on a diseased integument and obtains and carries away the virus which may infect a whole healthy community, so the latter, by giving publicity to morbid and

malignant rumors initiated by those suffering from pecuniary disappointment, ignorance, or disillusioned ambitions, have been able to infect public opinion throughout the country to a serious extent. And the entomological parallel holds true especially when we consider the extreme disproportion of cause and effect, and take note of the immense amount of mischief done by agents of absolute insignificance in themselves.

These pests may well be called "Human Mosquitoes."

CHAPTER XI

M. BUNAU-VARILLA AND THE REVOLUTION IN PANAMA

In naming the French as one of the controlling factors to bring about the existence to-day of a waterway across the Isthmus of Panama, the fact should not be lost sight of that to Philippe Bunau-Varilla, more than to any other individual Frenchman, is recognition due in the celebration of this, the greatest of all material triumphs of man over nature. M. Bunau-Varilla, who, at the age of twenty-six, was supreme director of the French Company at Panama, after strenuous efforts to save the project to France when the administration of its affairs became a national scandal, not only fought with incredible energy and almost single-handed the battle in the United States whereby the Nicaragua canal project was defeated in favor of the present route, but he personally directed the conduct of

the revolution that created the Republic of Panama and made the Canal possible.

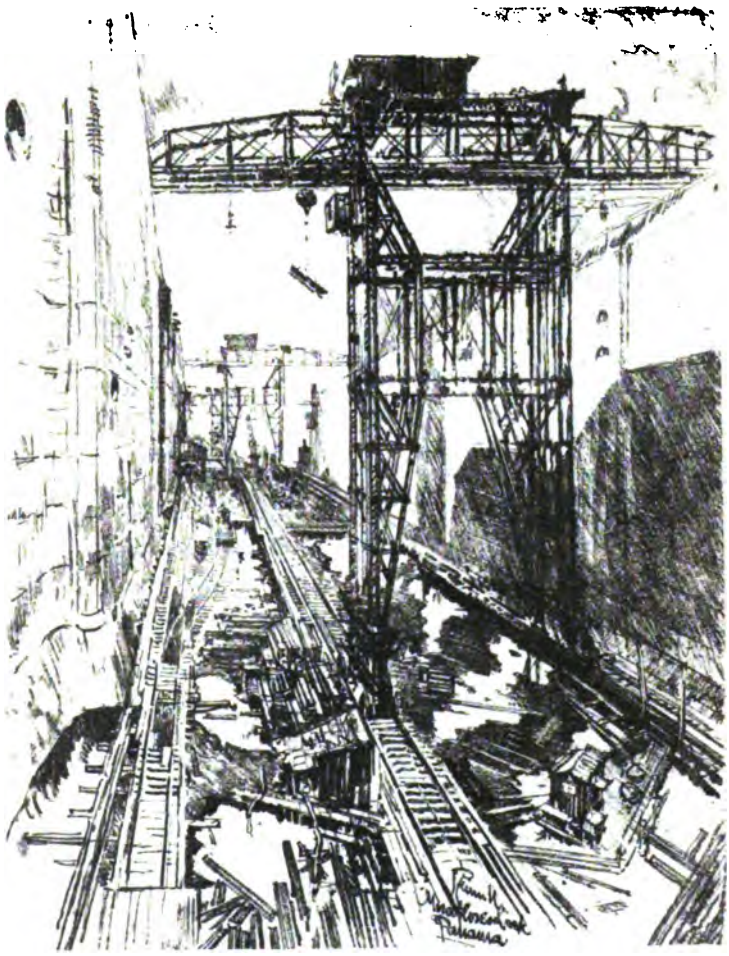
How the French engineer took the matter of the divorce of the Isthmus from Colombia out of the hands of the Panamanians, as told by him in *Panama: The Creation, Destruction, and Resurrection*, to which I have previously referred, is an illuminative footnote to history, and is particularly interesting in view of the charge that President Roosevelt fomented that small but important uprising against the Government at Bogota, and of the circumstance that Congress proposed to compensate Colombia for her losses. It was purely by accident that M. Bunau-Varilla arrived in New York on September 22, 1903, for it was at the last moment before sailing that he had decided to accompany Mme. Bunau-Varilla, who was on her way here to visit the family of the late John Bigelow, and her husband had intended to take the next boat back to France. On September 23rd the Hay-Herran Treaty between the United States and Colombia lapsed, owing to its non-ratification by the latter country, and M. Bunau-Varilla reached New York just in time to intercept Dr.

Manuel Amador, a prominent resident of Panama, afterwards President of that Republic, who had come to the United States as the representative of a group of citizens who were intent on revolution in the event that the treaty was not signed, but who had failed to accomplish the purpose for which he had been sent and was about to return to his own country. Dr. Amador told M. Bunau-Varilla that he and his associates in Panama had been led to believe, (through the efforts of Captain Beers, of the Panama Railroad) by a prominent American lawyer who professed to be on intimate terms with President Roosevelt, that the Government of the United States would assist them by the use of money and its army and navy to render the Isthmus independent of Colombia.

"Our friends then decided to delegate two of their number to go to Washington in order to reach a final understanding," said Dr. Amador. "I was one of the two delegates. But I was forced to go alone—the other one, being, at the last moment, unable to come. As soon as I arrived I was received with open arms by the persons whom Captain Beers had seen.

I was to go to Washington to see Mr. Hay, Secretary of State, in order to conclude the final transaction. But suddenly the attitude of the person who was to take me to Washington entirely changed. Whenever I went to see him strict orders had been given to the effect that he was not in. I had to install myself in the hall, to camp there, and, so to speak, besiege his office. Nothing resulted from it. And there I am. All is lost. At any moment the conspiracy may be discovered and my friends judged, sentenced to death, and their property confiscated. I at first decided to return to Panama to share their fate. But I am hesitating. If my friends are shot I prefer to devote my life to avenging them on the man who will have been the cause of their deaths."

"Dr. Amador," M. Bunau-Varilla replied, "you are telling me a very sad story, but why do you withhold the name of the man who thus promised you the gold of the American Treasury—the Army and the Navy of the United States? This childish proposition bears the stamp of the man who formulated it. There is but one person in the United States capable



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Cranes, Miraflores Lock

of expressing himself thus—William Nelson Cromwell. He has a habit of speaking of the highest persons of the State in the way you just described to me. What! You believed in such empty talk? With your imprudence you have, indeed, brought yourselves to a pretty pass."

"Alas!" returned Dr. Amador; "if we had been only dropped, but the case is much worse. I have just received a letter dated the 14th of September from one of our associates, Jose Agustin Arango. He says in it that the cablegram 'disappointed,' which I had sent after realizing my failure had leaked out. He telegraphed to the man you have just named on the 10th of September asking him to tell me not to correspond any more by the same channel, but to send my telegrams henceforth through Captain Beers. It was a pressing duty to transmit me this essential warning, upon which depended the safety of my friends. Well, it is incredible, it is monstrous, but nothing was said to me. I have been thus exposed unwittingly to the danger of giving up my friends to death, when it required merely the lifting of a finger to ensure their safety."

Dr. Amador went on to inform M. Bunau-Varilla that the leading men of Panama believed that the rejection of the Hay-Herran Treaty by Colombia would stop all activity on the Isthmus, ruin its inhabitants, and within a few years transform it again into a virgin forest. "There is to-day only a weak Colombian garrison at Panama," he said. "Moreover, these men, who had been living for many years on the Isthmus, have ceased to count as foreigners to us. Our emotions, our aspirations, are theirs. Their general, Huertas, a valiant soldier, who has his troops well in hand, is himself shocked at the way Colombia is behaving towards Panama. A revolution would to-day meet with no obstacle. But the Colombians have the command of the sea; their ships' crews are loyal. We must first, therefore, acquire a fleet to prevent Colombia from overwhelming with her troops the province of Panama. Besides that, we want arms. It was to obtain ships and arms that I have come here. Our first envoy, Captain Beers, had been assured, and the same pledge was repeated to me when I came, that the United States would give us all the money

we needed to buy arms and ships and to pay the troops."

"How big a sum do you consider necessary?" M. Bunau-Varilla inquired.

"We need $6,000,000," replied Dr. Amador.

The meeting between the Panama delegate and the eminent engineer ended with Dr. Amador's promise to remain in the United States, while the resourceful Frenchman endeavored to formulate a plan of action whereby the proposed revolution might be accomplished. In his book M. Bunau-Varilla analyzes the situation thus:

"Two days after my arrival in New York I had thus in hand the threads of the revolutionary plot hatched on the Isthmus. The confession of Dr. Amador showed me, likewise, that the man who had encouraged, then abandoned, him (whose name, Cromwell, was publicly revealed in 1912 by the documents of a Committee of Congress), had been powerless to interest the Washington Government in this plot. His absolute defection at the very moment when Amador expected to be led by him into Mr. Hay's office was significant. Evidently he must have sought by every means in his power to

induce the Washington Government to encourage the conspirators under one form or another. If he had suddenly turned completely round it was because he himself had received a flat refusal. He had felt himself incapable of fulfilling, even partially, the rash promises he had made first to Captain Beers and afterwards confirmed to Amador. He had then withdrawn, had abandoned the unfortunates who had trusted him, and henceforth affected to have had no connection with them.

"From these circumstances, as material as they were certain, resulted a fact extremely important for the study of the future and the preparation of events. They showed that the American Government explicitly refused to have anything to do with a revolution on the Isthmus.

"This conclusion was certain. It was thoroughly proved by what had happened, as is a mathematical truth by a lucid demonstration.

"But this attitude of Mr. Roosevelt's administration might itself be dictated by two different and entirely opposite considerations.

"It might be the result of a desire to have done with the whole Panama question in order to begin on the Nicaragua proposition as soon as the Colombian Congress should be dissolved.

"It might also result from the very natural desire to avoid any dishonorable connection

with the agents of an insurrection in a country with which America was at peace.

"To have a clear understanding of the future, it was essential for me to know as soon as possible which of these two hypotheses was the true one.

"The first hypothesis was not an unlikely one. On every side the failure of the Hay-Herran Treaty had produced a new blossoming of the hopes of the Nicaragua party. The Spooner Law gave an explicit mandate to the President of the United States to construct the Nicaragua Canal, if he could not obtain a satisfactory treaty for the Panama Canal. Public opinion still held for Nicaragua. Great popular papers like the New York *American*, or aristocratic papers like the New York *Herald*, were still carrying on strenuous warfare against Panama."

A series of fortunate accidents, by which, as M. Bunau-Varilla says, "the inmost thoughts of President Roosevelt were revealed to me," enabled him to solve the problem. Just before leaving Paris for America the Frenchman had written an article that was published in the *Matin*, suggesting that, in the event of the non-ratification of the Hay-Herran Treaty by

Colombia, the United States might,—under her treaty with New Granada, signed in 1846, which gave us the "right of way or transit across the Isthmus of Panama by any mode of communication that may already exist or that may be hereafter constructed,"—dig a ditch across Panama in spite of the opposition of the Bogota Government. M. Bunau-Varilla had sent this article to President Roosevelt.

A few days after his meeting with Dr. Amador, M. Bunau-Varilla was led by a chance remark of his friend, William H. Burr, professor of civil engineering at Columbia University, to seek an interview with the other's colleague, John Bassett Moore, professor of international law and diplomacy in the same institution, and he was able to draw the inference from their conversation, although the professor did not assert the fact, that the President had discussed the *Matin* article with him. The Frenchman was convinced by this circumstance that President Roosevelt still adhered to the Panama, rather than the Nicaragua, Canal route, else why should he have brought the New Granada treaty to Professor Moore's attention? This view was

corroborated in Washington, in October, by Roosevelt himself, as thus related in *Panama:*

"We conversed about the *Matin.* I was awaiting an opportunity to bring up the Panama subject. Mr. Loomis having cited the publication of the famous *bordereau* in the Dreyfus affair as being among the great achievements of *Le Matin,* I jumped at the opportunity. The bridge was found; I crossed it. 'Mr. President,' I said, 'Captain Dreyfus has not been the only victim of detestable political passions. Panama is another.'

"'Oh, yes,' exclaimed the President, suddenly interested, 'that is true; you have devoted much time and effort to Panama, Mr. Bunau-Varilla. Well, what do you think is going to be the outcome of the present situation?'

"It was then or never. I could by my answer know exactly what the President had in mind. I remained silent for a moment, and I pronounced the following four words in a slow, decided manner:

"'Mr. President, a revolution.'

"The features of the President manifested profound surprise. 'A revolution,' he repeated mechanically. Then he turned instinctively towards Mr. Loomis, who remained standing,

impassible, and he said in a low tone, as if speaking to himself: 'A revolution! . . . Would it be possible? . . . But, if it became a reality, what would become of the plan we had thought of? . . .'

"I had an intense desire to say to him: 'Mr. President, the plan of which you had thought is coercion of Colombia, based on the Treaty of 1846, as interpreted by Professor Bassett Moore. I have supported this idea in a letter to him, and added to it the doctrine of the expropriation of sovereignty for reasons of international utility. The letter was directed to him, but it was for you, Mr. President, and you must have read it.'

"Of course I remained mute, and I concealed my joy at hearing the interrogation which had escaped from the mouth of the President. He quickly recovered himself, and asked: 'What makes you think so?'

"There was no interest in going further. I answered: 'General and special considerations, Mr. President. As you know, the revolutionary spirit is endemic on the Isthmus. There is almost a certainty of seeing an endemic disease spread violently when the circumstances favorable to its development have reached their maximum. Colombia has decreed the ruin of the people of the Isthmus. They will not let things go any further without protesting according

to their fashion. Their fashion is—revolution. I have furthermore certain special indications that corroborate these general considerations.'

"The conversation ended there. I had no desire to say more, and the President on his side did not care to hear more.

"I left the private office of the President finally in possession of all the elements necessary for action.

"I had at last the direct confirmation of the inductions which thus far I had drawn solely from pure reasoning: the President of the United States was holding firm for Panama.

"If a revolution were to generate new conditions favorable to the acquisition of the Canal Zone by the United States, President Roosevelt would immediately seize the opportunity.

"I was henceforth certain of this capital point, as certain as if a solemn contract had been signed between us. No word had been pronounced, no concealed meaning had been attached to any sentence which could constitute a tie between us. His liberty was as complete as my own.

"I left Washington, having extracted the first and most essential of the unknown quantities from the problem confronting us. I had the basic thought of the American Government as to the application of the Spooner Law, without having said anything or heard

anything in confidence or under the guarantee of secrecy."

It now remained for M. Bunau-Varilla, as he says, "to discover the second unknown quantity,"—how to create a successful revolution at Panama, without the financial co-operation of the United States, and without the express promise of her military support. The great and apparently insurmountable obstacle was the obtaining of the $6,000,000 demanded by Dr. Amador and the necessary armament. The solution of the problem flashed upon M. Bunau-Varilla during his journey back to New York. It was that the treaty of 1846 gave to the United States the right, and imposed on her the duty, of turning any belligerents away from the line of transit—the Panama Railroad. All costly machinery of war to be purchased by Panama would, therefore, be useful solely to protect the insurrection in the western part of the province, near the frontier of Costa Rica. Why not give as territorial limits to the new Republic, at all events at the outset, the watersheds of the Chagres and the Rio Grande? M. Bunau-

Varilla reflected. In the basin of those two rivers, the common watershed of which was the summit of the Culebra, there were no inhabitants who did not live within gunshot of the line of communication between the oceans, and once Panama's independence was assured and the treaty with the United States ratified, the Republic would have $10,000,000 with which to wage war on Colombia and conquer the rest of the province.

It was only with the greatest difficulty that Dr. Amador was brought to comprehend the feasibility of this plan of campaign, and not until the Frenchman had promised him $100,000 out of his own pocket to pay arrears of wages to the soldiers who would take part in the proposed insurrection. The Panamanian representative would not at first believe that the proposition did not come from the White House, and as to the $100,000 loan, he, in the words of M. Bunau-Varilla, "certainly saw the shadow of one of those mysterious treasures of the American Secret Funds, which exist in fiction, but nowhere else."

M. Bunau-Varilla concluded his first inter-

view, after his visit to the President, with Dr. Amador, by dismissing the other with these words:

"Dr. Amador, if you close your eyes, you will see nothing. You came on the 23d of September in despair to ask me for support. Friday, October 13th, I offer it to you. If you refuse it, well and good. I have nothing more to say."

However, Dr. Amador called on M. Bunau-Varilla early the next morning.

"I have been thinking all night, and I have discovered that I am nothing but a fool," he said. "I have understood. Pardon me, I shall obey."

M. Bunau-Varilla told the Panamanian to prepare to leave for the Isthmus by the next boat, sailing Tuesday, October 20th, and he himself returned immediately to Washington to see John Hay, the Secretary of State, to whom he was introduced by an old friend, Assistant Secretary of State Francis B. Loomis.

Mr. Hay's views as to a canal across the Isthmus of Panama coincided with those of M. Bunau-Varilla; he saw in its opening a great service to the human family. Together they

deplored the blindness of Colombia in refusing to ratify the Canal treaty, and his visitor told the Secretary of the efforts he had made to show her rulers the light and how he had been baffled.

"When all the counsels of prudence and friendship have been made in vain," M. Bunau-Varilla concluded, "there comes a moment when one has to stand still and await events."

"These events," inquired Mr. Hay, "what do you think they will be?"

"I expressed my sentiments on the subject to President Roosevelt a short time ago," replied M. Bunau-Varilla. "The whole thing will end in a revolution. You must take your measures, if you do not want to be taken yourself by surprise."

"Yes," said Mr. Hay, "that is unfortunately the most probable hypothesis. But we shall not be caught napping. Orders have been given to naval forces on the Pacific to sail towards the Isthmus."

Having thus obtained information at first hand as to the attitude of the President and the Secretary of State with regard to Colombia

and Panama, M. Bunau-Varilla was prepared to act. To quote his own words:

"The interview with Mr. Hay would have removed my last hesitations if hesitation had been any longer possible.

"The Secretary of State had not feared to say that a revolution was expected in Washington, and that the United States had taken military precautions.

"They were probably the consequence of the formal assertion of opinion I had made to President Roosevelt, an assertion which the rumors current in the press entirely corroborated.

"It only remained for me to act. The United States would have a sufficient military force in the neighborhood of the Canal if the revolution broke out.

"I felt no doubt as to the only question which could burden my conscience: the security of the men who were to risk their lives on my word."

M. Bunau-Varilla prepared for the Panamanians a proclamation of independence, an outline for a constitution, a program of military operations, and a cable code, with which he dispatched Dr. Amador to the Isthmus on the

Tuesday following the interview with Secretary Hay, and with the express stipulation that he (M. Bunau-Varilla) should be entrusted with the diplomatic representation at Washington of the new Republic, when it should come into existence.

The successful and bloodless revolution of Panama is a matter of history, but the forceful and energetic part played in it by M. Bunau-Varilla, who directed operations from New York at the crisis, is written for the first time in *Panama: The Creation, Destruction and Resurrection*, and the story is too long and its intricacies too great for reproduction here. Of that revolution was born the Hay-Bunau-Varilla Treaty and the Panama Canal.

M. Bunau-Varilla thus states the case:

"With the ratification on February 23, 1904, of the Hay-Bunau-Varilla Treaty, I had won the last battle and assured the resurrection of the great French undertaking.

"It was fifteen years two months and nine days after December 14, 1888, that fatal day when its destiny was handed over to the powers of destruction, by a financial error which had

deceived the hopes of France, and had deprived her of the fruit of the expense of so many efforts, of so much blood and of so much money.

"During all this long period I could say that I had never forgotten for one single day the duty I had assumed of vindicating French genius by the triumphs of its immortal creation.

"I had not been able to convince my country, which had been deceived by impious sons. She had banished the child which she had brought forth, but I had succeeded in having it adopted by a friendly nation.

"I had preserved her offspring from the shameful death which so many passions, let loose from every quarter of the horizon, had prepared for it."

For his services at Panama the French Republic conferred upon M. Bunau-Varilla the Cross of Officer of the Legion of Honor. Secretary Hay wrote to him: "It is not often given to any man to render such a service to two countries and to the civilized world as you have done"; Theodore Roosevelt declares in his autobiography: "One of the foremost men in securing the independence of Panama, and the treaty which authorized the United States to build the Canal, was M. Philippe Bunau-Varilla, an eminent French

engineer formerly associated with De Lesseps; his services to civilization were notable, and deserve the fullest recognition"; President Obaldia of Panama, on the death of Dr. Amador, after he had been President of the new Republic, wrote thus to the Frenchman who had helped them in time of need: "Our people will keep eternally engraved in their memory your fruitful services, and will put in a preëminent place the names of Amador and your own. The national gratitude gives them the title of 'Benefactors of Panama.'"

M. Bunau-Varilla came from Paris to be present in Panama, on the occasion that the first ocean steamship went through the completed Canal—the third of last August. A letter he wrote to the editor of the *Sun* the following day not only shows the spirit with which the French met the greatest calamity of all time, but emphasizes the ghastly incongruity existing in the lapse of Europe into savagery simultaneously with the opening in the new world of the great waterway that is the last word in human progress. The letter runs thus:

"Yesterday was a day of glory!

"I have sailed across the continental divide on

the first ocean steamer, the *Cristobal*, which crossed the Isthmus of Panama from the waters of the Atlantic to the waters of the Pacific.

"It was not the inaugural trip, which is to take place on the fifteenth, and for that reason the ship did not go through the channel from Balboa harbor to the deep water of the Pacific.

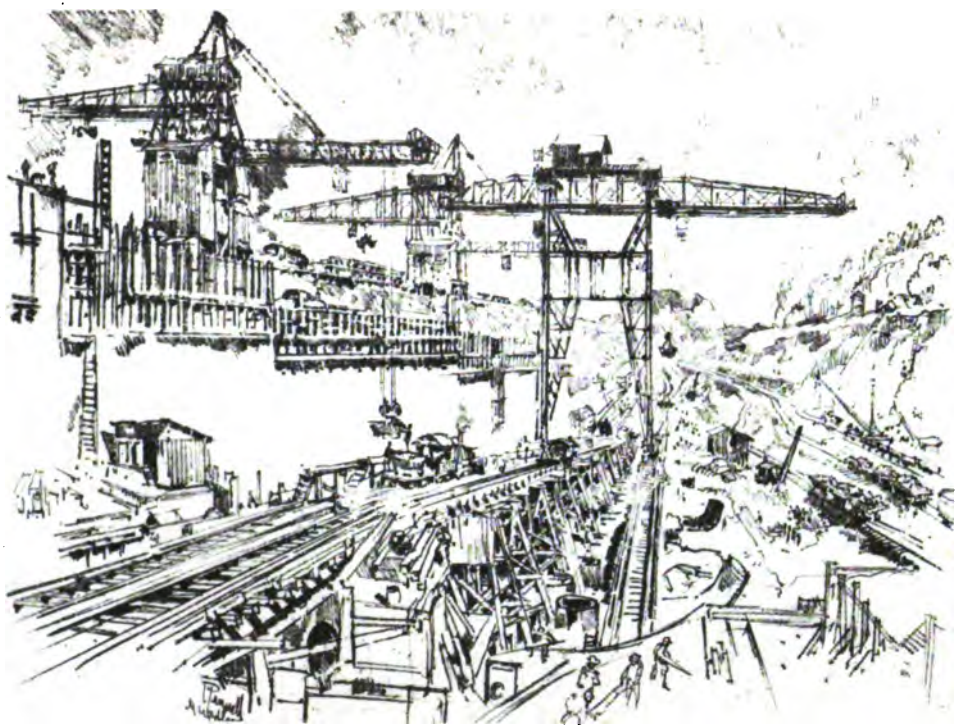
"But for the engineer, if not for the authorities and for the public, it was indeed the ringing of the bell which announced that the dream of ages had become a fact. And this bell has rung in the first year of the fifth century since the discovery of the Pacific!

"It was a day of glory also for the American nation which generously gives this great waterway to the world without any special privilege for herself or her citizens and without any mercenary consideration in view.

"It was a day of glory for the great engineer, Colonel Goethals, who carried to successful issue the stupendous enterprise.

"It was a day of glory also for the genius of the French nation, which first attacked the great task, which discovered all the technical solutions of a problem hitherto considered as impossible of realization.

"In spite of the yellow fever, in spite of all the obstacles then in the way, accumulated by nature and man, it would have been easy for



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The Walls of Miraflores

the French to open their Canal in 1891 had not the money been wanting in 1888. If the Canal had been in the hands of a Government with unlimited financial resources, instead of being in those of a private corporation, the credit of which became extinct in 1888, the Panama Canal would have been a fact twenty-two years ago.

"Yesterday was therefore a day of glory for the French genius because it was the day of the vindication of the aim for which it has so long and so stubbornly fought. It was a day of glory for Ferdinand de Lesseps and for his noble and generous son, Charles de Lesseps, who was the real head of the old company and who can alone witness the long-hoped-for day of victory.

"I had yesterday the supreme joy of seeing this glorious vindication when months only separate me from the thirtieth anniversary of my departure from France for the service of this great conception.

"But with this supreme joy was mixed yesterday another sentiment.

"As an echo to the cheers saluting the victory of Man over the American Cordillera I thought I heard the distant rattle of the French *mitrailleuses* defending the holy soil of the Fatherland against the German aggressors.

"On the same day when was ended the great

war initiated by the French Genius against Nature for the benefit of Mankind, another great war was begun, the war against the intolerable German military arrogance and autocracy.

"And the day that war began I was not in France to do my duty! I was in Panama.

"Since the beginning of my official connection with the Panama Canal it has caused me an unceasing series of moral hardships, sufferings, and trials.

"Never was the trial so cruel, never was the tribute paid by me to the great enterprise so costly, as on the very day of the final triumph.

"On that day, which I have been awaiting for thirty years, I was separated by five thousand miles from my place of duty in France. I have been expecting for forty-four years to fulfill that duty, and the service of the Panama Canal has prevented me from fulfilling it on the day of call.

"What a tragic coincidence, but also what a symbol of hope!

"What an auspicious and happy fact, the beginning of that war for the vindication of the dignity and power of France on the very day her Genius receives the most complete vindication, thanks to the magnificent performance of her historical friend, the United States of America!

"On my return to Panama, after passing through the Canal, my grief was alleviated by a cablegram. My son and my son-in-law had gone to the front! If I am not there to take my share of the peril, they will do both their duty and mine, while I am hastening to their side.

"Yes, indeed, it was a day of glory!"

The gallant Frenchman arrived in New York from the Isthmus on August 12th, going direct from the Panama steamship pier to that of the French line, whence he embarked that same day for his imperilled country to take his place among her defenders at the front.

CHAPTER XII

THE CANAL ITSELF AND WHAT IT MEANS

THE Canal Zone contains approximately 448 square miles, about 95 of which are under the waters of the Canal and Gatun and Miraflores Lakes. It begins at a point three marine miles from mean low water mark in each ocean, and extends for five miles on each side of the center line of the route of the Canal. It includes the group of islands in the Bay of Panama named Perico, Naos, Culebra, and Flamenco. The cities of Panama and Colon are excluded from the Zone, but the United States has the right to enforce sanitary ordinances in those cities, and to maintain public order in them in case the Republic of Panama should not be able, in the judgment of the United States, to do so.

Of the 448 square miles of Zone territory, the United States owns about 363, and 73 are held in private ownership. Under the treaty

with Panama, the United States has the right to acquire by purchase, or by the exercise of the right of eminent domain, any lands, buildings, water rights, or other properties necessary and convenient for the construction, maintenance, operation, sanitation, and protection of the Canal, and it can, therefore, at any time acquire the lands within the Zone boundaries which are owned by private persons. The United States also controls the area to be covered by Gatun Lake which extends beyond the lines of the Canal Zone. The population of the Canal Zone, according to the official census, is 62,810; of Panama City, 35,368; of Colon, 17,749.

The Panama Canal does not, as is quite generally believed, cross the Isthmus from east to west. Its general direction is from northwest to southeast, the Pacific entrance near Panama being about 22½ miles east of the Atlantic entrance near Colon. It is a lake canal as well as a lock canal, its dominating feature being Gatun Lake, an artificial body of water covering about 164 square miles and occupying the northern half of that portion of the Isthmus through which the Canal passes.

This lake is an elevated body of water with the surface level maintained from about 85 to 87 feet above sea level by the Gatun dam and locks on the Atlantic side, and by the Pedro Miguel locks and dam on the Pacific side. The Culebra Cut is really an arm of the lake. On both Atlantic and Pacific sides there is an approach channel, which is an inlet of the sea, extending from deep water in the sea up to the foot of the locks which lift vessels to the level of the lake, through which they pass.

The entire length of the Canal from deep water in the Atlantic to deep water in the Pacific is about 50 miles. Its length from shore-line to shore-line is about 40 miles. In passing through it from the Atlantic to the Pacific, a vessel enters the approach channel in Limon Bay, which has a bottom width of 500 feet and extends to Gatun, a distance of about seven miles. At Gatun it enters a series of three locks in flight and is lifted 85 feet,—about the height of the average six-story office building—to the level of Gatun Lake. It may steam at full speed through this lake, in a channel varying from 1000 to 500 feet in width, for a distance

of about 24 miles, to Bas Obispo, where it enters the Culebra Cut. It passes through the Cut, a distance of about 9 miles, in a channel with a bottom width of 300 feet, to Pedro Miguel. There it enters a lock and is lowered 30⅓ feet to a small lake, at an elevation of 54⅔ feet above sea level, and passes through this for about 1½ miles to Miraflores. There it enters two locks in series and is lowered to sea level, passing out into the Pacific through a channel about 8½ miles in length, with a bottom width of 500 feet. The depth of the approach channel on the Atlantic side, where the maximum tidal oscillation is 2½ feet, is 41 feet at mean tide, and on the Pacific side, where the maximum oscillation is 21 feet, the depth will be 45 feet at mean tide. The mean level in both Oceans is the same.

Throughout the first 15 miles from Gatun, the width of the Lake channel is 1000 feet; then for 4 miles it is 800 feet and for 4 miles more, to the northern entrance of Culebra Cut at Bas Obispo, it is 500 feet. The depth varies from 85 to 45 feet. The water level in the Cut is that of the Lake; the depth 45 feet. Three hundred

feet is the minimum bottom width of the Canal, beginning about half a mile above Pedro Miguel locks and extending about 8 miles through Culebra Cut, the channel being widened at all angles or turning points in order to form a basin big enough to allow a 1000-foot vessel to make the turn, for, as the Canal does not run in a direct line from Ocean to Ocean, these turning points or angles are necessary wherever there is a change in the direction of the channel. Culebra Cut has eight of these turning points, or about one to every mile, the 300-foot widths being on tangents between the turning basins. The least deviation of these angles at the turning basins is 7° 36′, and the greatest 30°. In the whole Canal there are 22 angles, the total curvature being 600° 51′. Of this curvature, 281° 10′ are measured to the right, going south, and 319° 41′ to the left. The sharpest turn is at Tabernilla, 67° 10′.

The Gatun dam, which forms Gatun Lake by impounding the waters of the Chagres and its tributaries, is nearly one and one half miles long, measured on its crest; nearly one half mile wide at its base; about 400 feet wide at the water sur-

face; about 100 feet wide at the top; its crest at an elevation of 105 feet above mean sea level, or 20 feet above the normal level of the Lake. It is in reality a low artificial ridge uniting the high hills on either side of the lower end of the Chagres Valley so as to create a huge reservoir. Of the total length of the dam only 500 feet, or one fifteenth, is exposed to the maximum water head of 85 to 87 feet. The interior or core of the dam is formed of a natural mixture of sand and clay, dredged by hydraulic process from pits above and below the dam, and placed between two large masses of rock and miscellaneous material obtained from steam shovel excavation at various points along the Canal. The entire dam contains about 21,000,000 cubic yards of material.

The spillway is a concrete-lined channel 1200 feet long and 285 feet wide cut through a natural hill of rock nearly in the center of the dam, the bottom being 10 feet above sea level at the upstream end and sloping to sea level at the toe. Across the upstream or lake end of this channel a concrete dam has been built in the form of an arc of a circle making its length 808 feet although

it closes a channel with a width of only 285 feet. The crest of the dam is 69 feet above sea level, or 16 feet below the normal level of the lake, which is 85 feet above sea level. On the top of this dam there are 13 concrete piers, with their tops 115.5 feet above sea level, and between these there are mounted regulating gates. Each gate is of steel sheathing on a framework of girders and moves up and down on roller trains in niches in the piers. They are equipped with sealing devices to make them water-tight. Machines for moving the gates are designed to raise or lower them in approximately ten minutes. The highest level to which it is intended to allow the lake to rise is 87 feet above sea level, and it is probable that this level will be maintained continuously during wet seasons. With the lake at that elevation, the regulation gates permit of a discharge of 137,000 cubic feet of water a second, the water issuing at a speed of 35 feet per second. This will take care of the greatest flood ever known on the Chagres. In addition to this, the culverts for the control of the locks can be opened, when a flood of 170,000 feet a second is provided for. Yet the Chagres can flow at its

highest known stage into Gatun Lake for five and one half hours, with all waste-weirs closed, and raise its level only one foot, while its level can be raised seven feet above normal without damage.

Adjacent to the north wall of the spillway, there is a hydro-electric station capable of generating through turbines 6000 kilowatts for the operation of the lock machinery, machine shops, dry dock, coal-handling plant, batteries, and for the lighting of the locks and Zone towns and, if desirable, the Panama Railroad. The building is of concrete and steel, and of a design suitable for a permanent power house in a tropical country.

The water level of Gatun Lake, extending through the Culebra Cut, is maintained at the south end by an earth dam connecting the locks at Pedro Miguel with the high ground to the westward, about 1400 feet long, with its crest at an elevation of 105 feet above mean tide. A concrete core wall, containing about 700 cubic yards, connects the locks with the hills to the eastward; this core wall rests directly on the rock surface and is designed to prevent perco-

lation through the earth, the surface of which is above the lake level. A small lake between the locks at Pedro Miguel and Miraflores is formed by dams connecting the walls of Miraflores locks with the high ground on either side. The dam to the westward is of earth, about 2700 feet long, having its crest about 15 feet above the water in Miraflores Lake. The east dam is of concrete, containing about 75,000 cubic yards; it is about 500 feet long, and forms a spillway from Miraflores Lake, with crest gates similar to those at the spillway of the Gatun dam.

There are six double locks in the Canal; three pairs in flight at Gatun, with a combined lift of 85 feet; one pair at Pedro Miguel, with a lift of 30⅓ feet, and two pairs at Miraflores, with a combined lift of 54⅔ feet at mean tide. The usable dimensions of all are the same—the length of 1000 feet, and width of 110 feet. Each lock is a chamber, with walls and floor of concrete, and mitering gates at each end. The side walls are 45 to 50 feet wide at the surface of the floor; are perpendicular on the face, and narrow from a point 24⅓ feet above the floor until they

are 8 feet wide at the top. The middle wall is 60 feet wide, approximately 81 feet high, and each face is vertical. At a point 42⅛ feet above the surface of the floor, and 15 feet above the top of the middle culvert, this wall divides into two parts, leaving a space down the center much like the letter U, 19 feet wide at the bottom and 44 feet wide at the top. In this center space is a tunnel divided into three stories, or galleries. The lowest gallery is for drainage; the middle for the wires that will carry the electric current to operate the gate and valve machinery installed in the center wall, and the upper is a passageway for the operators.

The lock gates are steel structures 7 feet thick, 65 feet long, and from 47 to 82 feet high. They weigh from 390 to 730 tons each. Ninety-two leaves are required for the entire Canal, the total weighing 60,000 tons. The leaves are shells of structural steel covered with a sheathing of steel riveted to the girder framework. Each leaf is divided horizontally into two separate compartments. The lower compartment is watertight, for the purpose of making the leaf so buoyant that it will practically float in the

water and thus largely relieve the stress upon the bearings by which it is hinged to the wall. This watertight compartment is subdivided vertically into three sections, each independently watertight, so that if the shell should be broken in any way or begin to leak, only one section will probably be affected. An air shaft 26 inches in diameter runs from the bottom compartment up to the top of the gate, and this also is watertight where it passes through the upper half of the leaf. Intermediate gates will be used in all except one pair of the locks, in order to save water and time. If desired, in locking small vessels through, the gates are so placed as to divide the locks into chambers 600 and 400 feet long, respectively. Ninety-five per cent. of the vessels navigating the high seas are less than 600 feet long.

The machinery for opening and closing the miter gates was invented in the office of the assistant chief engineer of the Canal, by Edward Schildhauer, as has been mentioned in a previous chapter. It consists essentially of a crank gear, to which is fastened one end of a strut or connecting rod, the other end of which is fastened to a

lock gate. The wheel moved through an arc of 197 degrees, closes or opens the gate leaf, according to the direction in which it is turned. One operation takes two minutes. The crank gear is a combination of gear and crank, is constructed of cast steel, is 19 feet 2 inches in diameter, and weighs approximately 35,000 pounds. It is mounted in a horizontal position on the lock wall; turns on a large center pin, and is supported at the rim in four places by rollers. The center pin is keyed into a heavy casting anchored securely to the concrete. The crank gear has gear teeth on its rim and is driven through a train of gears and pinions by an electric motor in a contiguous room. The motor is controlled by an operator who is stationed some distance away at a center control house near the lower end of the upper locks. A simple pull of a small switch is sufficient to either close or open a 700-ton gate, the operation being perfectly automatic.

No ship is allowed to pass through the locks under its own power, but is towed through by electric locomotives operating on tracks on the lock walls. The system of towing provides for

the passing through the locks of a ship at the rate of two miles an hour. The number of locomotives will vary with the size of the vessel. The usual number required will be four, two ahead, one on each wall, imparting motion to the vessel, and two astern, one on each wall, to aid in keeping the vessel in a central position and to bring it to rest when entirely within the lock chamber. They are equipped with a slip drum, towing windlass, and hawser, which will permit the towing line to be taken in or paid out without actual motion of the locomotive on the track. The locomotives run on a level except when, in passing from one lock to another, they ascend and descend heavy grades. There are two systems of tracks, one for towing and the other for the return of the locomotives when not towing.

As one of the principal objections made to the lock type of Canal was that the locks were liable to be rammed and put out of order by vessels going through them, extraordinary precautions in the matter of protective devices have been adopted at Panama. Fender chains, 24 in number, each weighing 24,098 pounds, have been

placed on the upstream side of the guard gates, intermediate and safety gates of the upper locks, and in front of the guard gates at the lower end of each flight of locks. They prevent the lock gates from being rammed by a ship that may approach the gates under its own steam or by escaping from the towing locomotives. In operation, the chain is stretched across the lock chamber from the top of the opposing walls and when it is desired to allow a ship to pass, the chain is lowered into a groove made for the purpose in the lock floor. It is raised again after the ship passes. The raising and lowering is accomplished from both sides by mechanism mounted in chambers, or pits, in the lock walls. This mechanism will consist of a hydraulically operated system of cylinders, so that one foot of movement by the cylinder will accomplish four feet by the chain. If a ship exerting a pressure of more than 750 pounds to the square inch should run into the fender, the chain will be paid out gradually by an automatic release until the vessel comes to a stop. Thus, a 10,000-ton ship, running at 4 knots an hour, after striking the fender can be brought to a stop within 73

feet, which is less than the distance which will separate the chain from the gate.

Double gates are provided at the entrances to all the locks and at the lower end of the upper lock in each flight, the guard gate of each pair protecting the lower gate from ramming by a ship which might possibly get away from the towing locomotives and break through the fender chain.

A dam of the movable type, called the "emergency dam," has been placed in the head bay above the upper locks of each flight for the purpose of checking the flow of water through the locks in case of accident resulting in damage, or in case it should be necessary to make repairs or to do any work in the locks which would necessitate the shutting off of all water from the lake levels. Each dam is constructed on a steel truss bridge of the cantilever type, pivoted on the side wall of the lock approach, and when not in use resting on the side wall parallel to the channel. When the dam is used the bridge is swung across the channel with its end resting on the center wall of the lock. A series of wicket girders hinged to this bridge are then lowered

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Administration Buildings, Panama.

into the channel with their ends resting in iron pockets embedded in the lock floor. After these wicket girders have been lowered into place they become runways for gates, or stops, which will be lowered, one at a time, closing the lower spaces between the wicket girders and next to the lock floor. These gates then form a horizontal tier spanning the width of the Canal and damming the water to a height of ten feet. Another series of gates are then lowered, resting on the first tier, and so on until the dam—constructed from the bottom up—completely closes the channel. When this dam has stopped the main flow of water, that due to the clearance between the vertical sides of the gates, is checked by forcing steel pipes between the sides of the adjacent panels. These dam operations are in three separate movements, and the machinery for operating is, therefore, in three classes, all driven by electric motors—gate-moving, raising and lowering the wicket girders, and hoisting the gates on the girders.

The gates, valves, and fender chains of the locks are operated by electricity, and controlled from a central point; that is, there is a central

control station for each of the series of locks at Gatun, Pedro Miguel, and Miraflores. This is on the same principle as the interlocking plant of a railway station, with the movement of every switch under the control of one man, so that no two operations can possibly interfere, since they cannot be carried on at all except in prescribed order. In passing a ship through the locks it is necessary to open and close the miter gates weighing from 390 to 730 tons; to fill and empty lock chambers containing from three and one half to five million cubic feet of water; to raise and lower fender chains weighing 24,098 pounds each, and to tow the vessel through the locks. All these operations, except that of towing, will be controlled by one man at a switchboard.

The control system of the Gatun locks is typical of the others. Water is let into the lock chambers or withdrawn from them by means of culverts under the lock floors, which connect with larger culverts in the lock walls, through which water is carried from the higher to the lower levels. The main supply culverts are eighteen feet in diameter, and the flow of water

through them is controlled by rising-stem gate valves, which can be completely opened or closed in one minute. In the center wall the culvert feeds both lock chambers, and therefore at each outlet into the lateral culverts there is a valve of the cylindrical type, in order that water may be let into or withdrawn from either chamber at will. A complete opening or closing of these cylindrical valves takes ten seconds. The miter gates cannot be opened or closed with a head of water on either side of them, as the chambers on each side of the gates must first be emptied or filled to an equal level by means of the valve and culvert system. The time required either to open or close the miter gates is two minutes.

A ship to be raised to the lake level comes to a full stop in the fore bay of the lower lock, prepared to be towed through one of the duplicate lock systems by electric towing locomotives. The water in the lower lock chamber is equalized with the sea level channel, after which the miter gates are opened, the fender chain lowered to the bottom of the lock, and the vessel passed over into the first chamber where the water is at

sea level. Then the miter gates are closed. The rising-stem gate valves at the outlet of the main culverts are also closed, while those from the next higher level are opened, allowing water to flow from that level into the lower chamber, which, when filled, raises the vessel 28⅓ feet, to the second level. This operation is repeated in the middle and upper locks until the ship has been raised to the full height of Gatun Lake, or about 85 feet above the level of the sea. At Gatun, in the passing of a large ship through the locks, it is necessary to lower 4 fender chains; operate 6 pairs of miter gates and force them to miter; open and close 8 pairs of rising-stem gate valves for the main supply culverts, and 30 cylindrical valves. In all, no less than 98 motors are set in motion twice during each lockage of a ship, and these movements may be increased to 143, dependent upon the previous condition of the gates, valves, and other operating devices. Some of the machinery chambers at Gatun are 2700 feet distant from the point of control; 90 per cent. of them are within 2000 feet, and 50 per cent. of the total within 1200 feet.

The station from which control is exercised

over the movement of all the machines is on the center wall at the lower end of the upper flight of locks at Gatun, and similarly placed at Pedro Miguel and Miraflores. It is in a building raised high enough above the top of the wall to allow a towing locomotive to pass beneath, and commands an uninterrupted view of every part of the locks. In this house is a double control board to conform to the duplication in locks. The control board is in the nature of a bench or table, thirty-two inches above the floor, containing a representation, part model and part diagram, of the flight of locks controlled by the respective series of switches. Standing at his switchboard the operator throws the switches, and sees before him in model or diagram the progress of the fender chains as they rise and fall; the movement of the miter gates inch by inch; the opening and closing of the gate valves in the main culverts at every stage; the operation of the cylindrical valves; and, in addition, indication of the gradual rise or fall of the water in the lock chambers.

The general scheme of lighting and buoying the Canal employs range lights to establish

direction on the longer tangents and side lights spaced about one mile apart to mark each side of the channel. The range lights are omitted in Culebra Cut, where their use is hardly practicable, and on four of the shorter tangents on the remainder of the Canal. In the Cut there are three beacons at each angle, and, between these, intermediate beacons in pairs on each side of the Canal. By keeping his ship pointed midway between these beacons, the pilot is able to adhere closely to the center of the Canal. On each tangent it is necessary to have two ranges of lights to prolong the sailing line, in order that the pilot may hold his course up to the point of turning. These range lights are situated on land. There are three types. The more elaborate structures are used on the Gatun locks and dam and in the Atlantic and Pacific divisions, where they are closer to the sailing lines of the vessels, while simpler structures are placed in the Gatun Lake, where they are under less close observation. A light and fog signal is located on the west breakwater in Limon Bay with a light on the east breakwater. The illuminants are gas and electricity, the latter

being used whenever the location of the light is accessible. For the floating buoys, and for the towers and beacons which are at inconvenient locations, the system using compressed acetylene dissolved in acetone has been adopted. The buoys are composed of a cylindrical floating body or tank, surmounted by a steel frame which supports the lens at a height of about fifteen feet above the water level. The buoys are moored in position along the edge of the dredged channel by a heavy chain and a concrete sinker, and should remain lighted for six to twelve months without being recharged. The candle power of the range lights varies, according to the length of the range, from about 2500 to 15,000 candle power. The most powerful lights will be those marking the sea channels at the Atlantic and Pacific entrances, they being visible from about twelve to eighteen nautical miles. The beacons and gas-buoy lights will have about 850 candle power. White lights are used throughout, and, in order to eliminate the possibility of confusing the lights with one another and with the lights on shore, all range lights, beacons, and buoys have individual character-

istics formed by flashes and combinations of flashes of light and dark intervals, conforming to the usage of the lighthouse service of the United States.

At the last public reckoning, May 31, 1914, we had paid out in the construction of the Canal a little more than $329,500,000 of the $375,000,000 that was appropriated for that purpose by Congress. It is probable that the final cost will be not more than $400,000,000, which attests not only the skill and care with which the original estimates were made, but the efficiency with which the plans upon which they were based have been carried out.[1] What will be the immediate and comprehensible result of the expenditure of this great sum? The average American is likely to inquire to what extent the United States will be able to preserve to her citizens the economic advantages attendant upon the changed conditions; he will ask about effects upon American industries and competitive trade centers, and how our relations with European markets will be affected—when European

[1] See Appendix, page 406: "A Triumph for the Engineering Profession."

markets are again opened to trade. He will estimate the effect of the opening of the new road between the Oceans upon transcontinental railroad business, and will wish to know whether it will, to a greater extent, open up China and other parts of the East to America's trade; how it will affect business relations with Mexico and Central and South America; whether it will strengthen our military and naval position; what effect it will have upon the Monroe Doctrine. A vitally important question, as affecting the commerce of the United States in the opening of the short cut across the Isthmus of Panama, is its relation to American shipbuilding.

Though the Panama Canal is for the benefit of the entire world, and though the purpose of the United States is to permit its use upon equal terms by all nations, the underlying idea in its construction was not entirely philanthropic. Our motives were not wholly disinterested, because we believed that the operation of the new waterway would not only more than double the efficiency of our Navy, but would especially stimulate American industries. It is not possi-

ble to forecast with any degree of certainty the effect that a shorter route between the Atlantic and the Pacific will have upon the commerce of the world, but as experience has shown that an increase in transportation facilities such as the Canal will bring about invariably tends to rapid development of traffic, it is only reasonable to assume that existing trade conditions in various quarters of the globe will undergo more or less important changes. As the United States is so much nearer than countries of Europe to ports on the Pacific Ocean whose commerce will be affected by the opening of the Canal, there is no reason why the merchants of our country may not successfully compete for this traffic with the advantage of lower freights and quicker transit, the more particularly now that the European war gives us unprecedented and hitherto unthought-of opportunities. As to which of our competitive centers of trade in the United States are most likely to be affected by the opening of the Canal, that is problematical. On the Pacific side, San Francisco unquestionably will become more of a distributing center than at present, because of the lower rates its

merchants will pay on traffic that goes by way of the Canal; for under the new conditions a vessel will be loaded on the Atlantic coast and unloaded on the Pacific, and vice versa, instead of having its freight transshipped by rail across the Isthmus of Panama or the Isthmus of Tehuantepec. Other ports on the Pacific such as San Diego, Los Angeles, Portland, Seattle, and Tacoma, will derive a similar advantage from the opening of the Canal—a service with no transshipments that will be almost, if not quite, as rapid by even a 16-knot ship as that now given by the transcontinental railroads. On the Atlantic side, New York is now and always has been the principal port for cargoes moving to and from the Pacific coast, but the opening of the Canal will undoubtedly result in an increase of that traffic between other Atlantic ports and ports of the Gulf of Mexico. Indeed, Boston, Philadelphia, Baltimore, Norfolk, Newport News, Wilmington, Charleston, Savannah, New Orleans, Mobile, Galveston, Pensacola, and many smaller cities on the Atlantic and Gulf coasts are preparing for new trade possibilities when the short water route

shall be accessible. The more southerly Atlantic ports and the Gulf ports should benefit by the traffic moving from the middle West to Pacific ports because they are from 600 to 800 miles nearer the Canal, although in order to secure any considerable portion of this traffic these Southern ports must be furnished with a regular and dependable steamship service.

The impetus which the Panama Canal will give to American coal interests will be of particular importance. Vessels in our own and in the European trade which use the Isthmian route will find it to their commercial advantage to buy coal supplies at Pacific ports north and south of the Canal and at the great coaling station to be established at the Atlantic end of the new waterway. The cheapness of American coal, with the vast quantities of it mined at points which will be much nearer those ports than any other of equal quality, will enable the United States to dispose of large quantities of it from these centers.

The water route between San Francisco and New York by way of the Panama Canal is almost 8000 miles shorter than by the old method

of travel through the Straits of Magellan. Nevertheless, railroad men do not hold what seems to be the popular view, that the opening of the Canal will have a serious effect upon the business of the transcontinental railroads of the United States; on the contrary, they are inclined to believe that it will be to their advantage as soon as trade conditions adjust themselves. The traffic of the transcontinental railroads that will be most seriously affected is that which originates at Atlantic coast points, destined to ports on the Pacific, and vice versa. With this traffic the steamers that operate by way of the Canal will come into direct competition; and, as their rates will be lower and the time taken in transit approximately the same as is now taken by the railroads, diversion of business is naturally to be expected. The tonnage actually handled from coast to coast is not, however, as important as that which originates at interior points and is brought to the coast to take advantage of the low rates quoted by competitors of the transcontinental railroads. But this competition will be limited to the movement of traffic only where the railroad rate for the haul from interior points

to the seaboard, plus the ocean rate, is lower than the rate charged by the transcontinental railroads from interior points to destination. The railroads may possibly lose some of their cheaper tonnage, but this will be more than made up to them by the inevitable increase in higher class traffic that will be brought about by the development of the territory they serve.

The opening of the Canal cannot fail to increase, to a large degree, the shipments, such as canned goods, dried fruits, lumber, and other products, that until the beginning of the war moved by way of the Isthmuses of Panama and Tehuantepec from the west coast of the United States to European ports. Strange as it may seem, the principal obstacle to the present development of this traffic is the disinclination of American shippers to forward their goods in containers that are sufficiently strong to withstand the necessary rehandlings at every point of transshipment. The loss that results from the arrival of shipments requiring recoopering, repacking, or relabeling is much heavier than would be imagined. With the opening of the Canal, transshipment is unnecessary; no

VANCOUVER
PORT TOWNSEND
SAN FRANCISCO
MONTREAL
NEW YORK
NEW ORLEANS
TAMPA
ST. THOMAS
COLON
PANAMA
BOGOTA
GUAYAQUIL
CALLAO
IQUIQUE
VALPARAISO
RIO DE JANEIRO
BUENOS AIRES
PUNTA ARENAS
DISTANCES BY
STEAMSHIP ROUTES
FROM
COLON (CHRISTOBAL)
TO
PANAMA (BALBOA) 50 MILES
TAMPA 1210 "
NEW ORLEANS 1395 "
NEW YORK 1974 "
BOSTON 2184 "
LIVERPOOL 4548 "
GIBRALTER 4843 "
HAMBURG 5067 "
FROM
PANAMA (BALBOA)
TO
SAN DIEGO 2836 MILES
SAN FRANCISCO 3238 "
PORTLAND 3886 "
PT. TOWNSEND 4008 "
GUAYQUIL 793 "
CALLAO 1346 "
VALPARAISO 3609 "
PUNTA ARENAS 3841 "
HONOLULU 4685 "
SIDNEY 7787 "
NEW YORK TO SAN FRANCISCO BY RAIL 3183 MILES.

improvement in form or style of containers will be required, and delivery may be made in complete bill-of-lading lots in a condition satisfactory to shippers and consignees. Such improved delivery cannot fail to result in a large increase in the amount of traffic to be handled. The products of the wheat fields of western Canada should be handled advantageously in ships to Europe by way of the Canal, when trade with Europe is resumed.

The water route across the Isthmus will have a very beneficial effect on the traffic exchanged with the countries of Central and South America, especially those on the Pacific coast. By way of the Canal the journey from New York to San Francisco[1] is shortened 7800 miles; that to Guayaquil, the principal port of Ecuador is shortened 7400 miles; that to Callao, the principal port of Peru, 6200 miles; that to Valparaiso and Iquique, the principal ports of Chile, respectively 3700 and 5100 miles. Under the changed order of things, satisfactory delivery of shipments will be made to consignees, the losses

[1] See Appendix, page 355: "The First Ship through the Panama Canal."

incident to rehandling and transshipment will be avoided, and in addition to these advantages the ports on the Pacific will be served more frequently than at present. It is true that only a few Central and South American ports are capable to-day of giving full cargoes to steamers, but this condition will change now that the Canal is opened. Freight rates will be lowered; and, as the ports of the United States are much nearer than those of Europe, the development of traffic between this country and South America may be regarded almost as a certainty, even without the enormous advantages the war in Europe gives us. With the development of traffic is engendered friendship; and, with the maintenance by the Government of the United States of a policy which will satisfy the South American republics that it is furthest from our intention to exercise anything like sovereignty over them or supervision of their affairs, our relations with them should be of the most satisfactory character.

The opening of the Panama Canal will not seriously influence the traffic with China and other parts of the Orient which now goes by way

of the Suez Canal, because there will be practically no saving in time by the new route. The distance between New York and Hongkong is only 245 miles less by way of Panama and the San Francisco trade route than by way of Suez. However, the traffic that now moves across the Pacific to United States and Canadian ports and then overland by rail, and vice versa, will be subjected to competition by way of the Canal, and an increase in the traffic with China and the Orient may confidently be expected.

It is not probable that the opening of the Canal will affect our political relations with adjoining countries which have territory upon both the Atlantic and Pacific oceans, such as Mexico, because the new route will not bring us any nearer than the railroads that are now in existence. In a trade sense, however, the opening of the Canal brings the western coast of Mexico into much closer proximity to the manufacturing sections of the United States for shipments which are water-borne.

At present the naval forces of the United States are distributed partly on the Atlantic and partly on the Pacific Ocean; and, when it is

necessary to transfer a warship from one ocean to the other, a delay of from fifty to sixty days is encountered in making the trip down one coast to the Straits of Magellan and up the opposite coast. With the opening of the Canal, the Atlantic and Pacific fleets of the United States may be combined upon one or two weeks' notice. It is doubtful whether the Panama Canal would have been built, save for these conditions as affecting the Navy. We all remember the national anxiety when, during the Spanish-American War, before the practical application of wireless telegraphy, the fast battleship, *Oregon*, was ordered from the Pacific to the Atlantic, with the chance of being attacked by a squadron of the enemy on the journey. The *Oregon* left San Francisco on March 9, 1898, and was not heard from again until she steamed into the harbor of Rio de Janeiro on April 30th. This cruise of the *Oregon*, as demonstrating what a short cut across the Isthmus of Panama would mean in time of war, was a most potent influence in bringing our legislators at Washington to vote for the Canal. The circumstance that the Atlantic and Pacific fleets may be combined

upon short notice will not, of course, affect the naval standing of the United States among the nations of the world, but it will make our Navy more effective in that it may be considered a unit when the Isthmian waterway is opened for operation.

The effect of the opening of the Canal upon the Monroe Doctrine, and the international situation created thereby, may be important or unimportant, as events shall prove. It has no logical bearing upon the construction of the terms of that instrument outside of the United States, but the fact that the Canal will make it possible to concentrate our entire Navy quickly at one point should have the effect of strengthening the Monroe Doctrine, in that it places this country in a more effective position to maintain it.

APPENDIX A

THE FIRST TRADE SHIP THROUGH THE PANAMA CANAL

THE first trade ship to pass through the Panama Canal was the *Pleiades*, which made the trip from the Pacific to the Atlantic in eight hours on the 16th of August, 1914, having left San Francisco on the 27th of July, and reaching New York on the 26th of August. Under the heading: "First Canal Ship Reaches New York in 30 Days from San Francisco—*Pleiades* Cuts Time of 'Round the Horn' Voyage in Half and Doubles Earnings," the New York *American* publishes the following:

"To the welcome of a thousand whistles, blown by all the ships in the harbor, the trim little American freighter *Pleiades* came into port yesterday, her signal flags announcing that she had the proud distinction of being the first steamer to carry a cargo from San Francisco to New York by way of the Panama Canal.

"Further, the *Pleiades* was the first steamer to carry cargo from the Pacific to the Atlantic through the Canal. She had 5000 tons—lumber and general merchandize—in all, and the voyage was the most profitable she ever has made since she was launched at Sparrow's Point, Md., fourteen years ago.

"The opening of the Canal to commerce means that the earning capacity of the *Pleiades* and vessels of her kind

has been doubled. She made the voyage in thirty days, whereas it took her sixty-five to go around the Horn. She can thus make two trips where formerly she made one.

"The tolls exacted by the Government for the job of lifting and lowering the steamer and her burden through the locks on the Isthmus have not yet been decided, but whatever they are the *Pleiades'* owners are satisfied there will be plenty of profit left.

"Captain N. W. Liberoth declared the passage through the Canal was easier than getting his ship in dry dock, and that the *Pleiades* went through from Balboa to Colon in eight hours.

"'We left San Francisco July 27th and started through the Canal toward the Miraflores Locks at 6:06 A.M. on August 16th,' he said. 'Two Government pilots were in charge of the steamer, one being a "lock pilot," the other a "canal pilot."

"'One hour later we had entered Miraflores and had passed our lines forward, aft, and amidships to the engines on either side that were going to tow us. There was no hitch and no delay, and twelve minutes later we were entering the first gate. We entered Pedro Miguel at 8:35, and four hours later entered Gatun. At 5:33 we stopped, the pilots got off and we started again for New York.

"'In the old days a freighter would take from sixty to seventy days steaming from San Francisco to New York by way of Cape Horn, and on such a long voyage a lot of time would be wasted in coaling.

"'This trip took thirty days, and as we burn oil we had sufficient for the whole trip. We shall now be able to get back to San Francisco again by the time we would in

the past be arriving at New York. This means that the ship can earn twice as much and instead of building new vessels ship owners will be able to increase their services with their present tonnage. It will be easier to get crews as well for the shorter runs.

"'When owners realize how smoothly everything is working in the Canal and the Cucaracha Slide has been dredged and widened, they will take advantage of the new route as, tolls or no tolls, they are certain to increase their profits.'"

APPENDIX B

FAREWELL TO MR. STEVENS

UNDER the heading "Farewell Reception to Mr. Stevens—Ex-Chief Engineer Leaves the Isthmus," the *Panama Star and Herald*, of April 9, 1907, published the following article:

"John F. Stevens sailed for the United States at noon, Sunday, on the Panama Railroad steamer *Panama*.

"The crowd on the wharf was probably the largest that has waved adieu to any ship leaving Colon since the Americans have been in charge of canal work. The *Panama* was flying all her signal flags in honor of her distinguished passenger, and when the *Allianca* dropped out into the bay to salute the departing ship as it passed, Captain Sukeforth had her dressed from bow to stern. It was exactly noon when the *Panama* left the wharf. Almost everyone had shaken hands with Mr. Stevens and his son, John F., Junior, and shortly after the Canal Commissioners left the ship she moved out to sea. The *Allianca* and other vessels in the harbor whistled their salutes, the crowd waved hats and handkerchiefs, and many shed tears while the I. C. C. band played *Auld Lang Syne*. Mr. Stevens stood at the rail, and as long as he could be recognized his face was pale and sad.

"The reception in his honor on Saturday night brought together all the Americans at Cristobal and as many

from the Canal Zone as could be brought in by six regular and special trains, each car of which was crowded when it arrived at Colon. Three special trains left Colon for points along the Canal Zone after the reception Saturday night; but, notwithstanding the departure of the passengers they carried, the hotels of Colon and the homes of the people at Cristobal were taxed to their utmost to remain over until Sunday morning to witness Mr. Stevens' departure.

"Pier II, where so many receptions have been held, has now been so much improved that it was possible to make the arrangements for the guests and the decorations for this reception more elaborate than has ever been attempted before. Flags, lights, and palms were in the usual profusion. The new waiting-room built for the use of the passengers on the Panama Railroad steamships afforded an admirable dressing-room for the ladies, and seats for the dancers had been built around the engines on the wharf, the machinery having been covered with bunting and greens.

"The last special train was about forty-five minutes late in reaching Colon, but Mr. Stevens and the reception committee waited until it had arrived and its passengers reached the pier. On the receiving stand Commissioners Jackson Smith, Colonel Gorgas, Assistant Chief Engineer Ripley, and Messrs. Noble, Stearns, and Freeman (the consulting engineers who accompanied Mr. Taft), Executive Secretary Reed, Consul General Shanklin, Captain Shanton, and a number of ladies were gathered to receive Mr. Stevens. About nine-thirty he was escorted to the wharf by Mr. Bierd, Mr. Tubby, and Mr. Maltby. Mr. Stevens escorted Mrs. Tubby and immediately after them came Mrs. Bierd and Mr. Tubby,

who were followed by Mr. and Mrs. Maltby. While the band played *The Conquering Hero Comes*, the assembled guests made an aisle through which Mr. Stevens and his party passed to the receiving stand. His entrance was the signal for a burst of applause which continued until Mr. Bierd, as the presiding officer of the occasion, arose to say good-by to Mr. Stevens in the name of the men on the canal work.

"With a great deal of feeling Mr. Bierd said it was unnecessary for him to make any announcement of the reasons for the gathering, that its one common and inspiring cause was so deeply impressed in the heart of everyone present that the speaker could hope only inadequately to make Mr. Stevens understand the full measure of the regard and affection in which he is held by the men who have served under him. Mr. Bierd reviewed in a general way the work of the last two years, and said that while Mr. Stevens had not been an easy taskmaster, he had won the respect and even the love of all his employees because he had convinced them they were serving a man able at all times to overcome all the problems involved; to keep together all the details making for the success of the whole work; and whose decisions always impressed his subordinates with belief that they had been made for what he believed to be right. As Mr. Bierd said, it was to bid such a chief Godspeed that they had assembled.

"Mr. Stevens modestly gave credit to Mr. Wallace for the organization he found on the Isthmus and which Mr. Stevens said he has modified only as necessity required. Two years ago the speaker said he would admit that he was almost as overawed as was the President, the Cabinet, and the people at large in the United

States, by the amount of preparation, construction, railroad, and sanitary work required. Until Colonel Gorgas had lifted the dark cloud which the unsanitary conditions placed over the work, Mr. Stevens said that he was in doubt as to the measure of his possible success. When Colonel Gorgas had removed that doubt, Mr. Stevens knew the men with him would put through the Canal, and that what it is to-day is due to the loyalty of every unit among the employees.

"Mr. Stevens said he felt justified in resigning because he undertook command of the work under protest and now conditions are such that he feels absolutely assured that the Canal can be opened on January 1, 1915.

"As to the future, Mr. Stevens asked the men on the Isthmus, as their sincere friend, not to even think of taking any little differences and complaints to Washington, but to Colonel Goethals, for whom he asked the same loyalty heretofore shown to himself.

"Mr. Bierd then told Mr. Stevens that the men on the work have subscribed for some tokens of their regard which will be sent to him as soon as they are completed. The nature of the gifts selected was not stated to Mr. Stevens, but they will include a silver service, a watch, and a ring. Three were selected because of the desire to let Mr. Stevens have from the men on the Canal something he may pass on to each of his sons. For years he had worn a plain gold ring, of which he was especially fond. This ring was stolen from him twice and as many times recovered, but a third time it disappeared and has never been regained. Those that know him have planned to make the ring given by the Canal men as nearly like as possible to this favorite of his.

"Just before leaving, Mr. Stevens was presented with

the petition circulated and signed the moment his resignation became known on the Isthmus. This was prepared in two volumes. One containing all the signatures sent by the men in the different departments of the Isthmian Canal Commission and the other all the signatures of the men on the Panama Railroad. The Isthmian Canal Commission bindery bound both volumes and with the case made to hold both of them they make a souvenir which appealed to and affected Mr. Stevens very much."

APPENDIX C

SOME LETTERS ABOUT MR. SHONTS

With the permission of the men mentioned in Chapter III., to whom Secretary Taft addressed his letters of inquiry concerning Mr. Shonts, I publish their responses.

GRAND CENTRAL STATION
NEW YORK

March 21, 1905.

MY DEAR SIR:

I have your letter under date of the 18th making inquiry as to the fitness of Mr. T. P. Shonts for carrying on, as chief executive, the great work of constructing the Panama Canal.

Mr. Shonts has had considerable experience both in the construction and operation of railroads and has been very successful in handling them; as this work has been mostly in the West, since I left that section, I have not had an opportunity of judging as to his capacity for such a position as referred to in your letter, though from what I have seen and heard of him, I believe he would not undertake the work unless confident that he could handle it successfully.

Very respectfully yours,
W. H. NEWMAN.

HON. W. H. TAFT,
Secretary of War,
Washington, D. C.

NEW YORK CENTRAL AND HUDSON RIVER R. R. CO. LA SALLE STREET STATION

CHICAGO, March 21, 1905.

HON. WM. H. TAFT,
Secretary of War,
Washington, D. C.

MY DEAR SIR:

Your confidential favor of March 18th, forwarded from New York, has just reached me, and in reply I beg to say that I have known President Shonts of the Clover Leaf Railroad for about twenty years, and have watched his work in the construction of new roads, the reconstruction of old roads, and the operation of railroads, and do not hesitate to say that in my opinion he possesses in eminent degree the qualifications necessary to carry out the work of constructing the Panama Canal.

Mr. Shonts is a man of absolute integrity, untiring energy, and of extraordinary resource, and he has the faculty of inspiring the men under him in a large degree with his energy and push.

With assurances of my high regard, I beg to remain,

Very respectfully yours,

W. C. BROWN,
Vice-President.

ST. LOUIS, March 20, 1905.

SIR:

In response to your favor of the 18th in reference to Mr. T. P. Shonts, I beg to say that I have no personal knowledge of his qualifications for the work you have in mind for him, but knowing him as I do, I think the government would be most fortunate in securing a man of unquestioned integrity and who is recognized by the

leading railway officials of the country as having no superior in the construction of railroads.

He has marked executive ability, and basing my judgment on what I know of him personally, and from what others competent to judge think of him, if I were left to select a man, there is no man of my acquaintance whom I believe is better equipped for the work.

Very respectfully,
C. H. SPENCER.

HON. WM. H. TAFT,
Secretary of War,
Washington, D. C.

IOWA CENTRAL RAILWAY

NEW YORK, March 20, 1905.

HON. WM. H. TAFT,
Secretary of War,
Washington, D. C.

DEAR SIR:

I am in receipt of your letter of the 18th instant making inquiry concerning Mr. T. P. Shonts. In reply would state that I do not know of another man who is so well qualified to take charge of so great and important a work as that to which you refer. His age is not only in his favor; but he is energetic and forceful in his methods, and what is more, he knows how to apply those qualities effectively and to the best possible advantage.

Very respectfully yours,
E. HAWLEY.

W. A. READ & COMPANY
NEW YORK

March 20, 1905.

HON. WILLIAM H. TAFT,
Secretary of War,
Washington, D. C.

MY DEAR SIR:

Replying to your favor of the 18th instant, I have known the gentleman of whom you write for something over a year. He is, in my judgment, a man of great ability, with a tremendous capacity "for pushing things and making work go."

Regarding his experience in works of construction, I regret to say that I am unable to inform you. His record as a railroad man is first class and the endorsements that we received concerning him from prominent railroad men of the country when we thought of asking him to become President of the Clover Leaf Railroad were of the highest and warmest character.

He built up the Indiana, Illinois & Iowa Railroad (which he practically owned) from a small and insignificant property into one that became of so much value that he sold it to the Lake Shore Railroad at a very large price.

Since he has come with the Clover Leaf road he has immensely improved the position of that property, both as to its physical condition and as to its power to get and to handle business.

He is unquestionably a man of great force and great initiative and one who compels those that are about him to do what he desires, or else forces them out of his path. If he can be given a reasonably free hand

and if he surrounds himself with the proper engineering talent, I feel certain that he can make a success of the great enterprise of which you write, provided his health will withstand the strain of the climatic conditions and the immense burden that will be put upon him.

With great respect, believe me to be,

Yours very sincerely,

WILLIAM A. READ.

SPEYER & CO.
24 & 26 PINE STREET

NEW YORK, March 20, 1905.

Confidential.

MY DEAR SIR:

Your favor of the 18th instant was delivered to me this morning, and I hasten, in accordance with your request, to make immediate reply.

I have known Mr. T. P. Shonts for nearly ten years, and although my acquaintance with him began in a purely financial way, whilst I was connected with the Continental Trust Company, I have since learned much more about the character of the work which he has done in the railroad world, particularly in connection with the I. I. I. road, and I have the very highest opinion of his capacity for just such work as you indicate you desire him to undertake. From practically out of nothing Mr. Shonts evolved a paying railroad property, and after disposing of that took charge of the more or less discredited Clover Leaf, and I was recently told by those interested in that road that he was there making a great success.

There is another point about Mr. Shonts: He is as

straight as a string and absolutely independent. He is no man's man and never will be; has great confidence in himself—justly so—and allows no interference in his work by any one. I am bound to add that I have the greatest personal admiration for Mr. Shonts, and therefore my opinion may be somewhat prejudiced in his favor, but I have no doubt that you would receive the same opinion from those who were intimately associated with him both in the I. I. I. and in the Clover Leaf.

Permit me to add that in my opinion, should the President be so fortunate as to obtain the services of Mr. Shonts in the capacity you indicate, it would be a very desirable thing for the country, although it would not exactly suit some plans which are in a more or less inchoate condition in my mind.

Yours faithfully,
GORDON MACDONALD.

HON. WILLIAM H. TAFT,
Secretary of War,
Washington, D. C.

OSCAR G. MURRAY
BALTIMORE

March 21, 1905.

Personal.

MY DEAR SIR:

Responding to your note of March 18th, I have intimately known Mr. Shonts for over ten years, and have found him to be a very sterling man. He is energetic and active. Am not positive that he has ever made a

study of Civil Engineering, which may be necessary for the position to which you refer.

Of course, I understand that this communication will be treated in a confidential manner.

If I can be of any further service in the matter, please let me know.

Yours very truly,
OSCAR G. MURRAY.

HON. WILLIAM H. TAFT,
Secretary of War,
Washington, D. C.

THE ROCK ISLAND COMPANY
71 BROADWAY

NEW YORK, March 20, 1905.

Confidential.

MY DEAR SIR:

Replying to yours of the eighteenth.

I have known Mr. Shonts for the past eight or ten years. During several of those years I was associated with him as Director and Counsel of the Indiana, Illinois & Iowa Railroad Company, which had been operated by Mr. Shonts until its sale to the Lake Shore & Michigan Southern Railway Company. During the time of my connection with the company its lines were considerably extended, the work of construction being under charge of Mr. Shonts. The work was promptly, efficiently, and economically done. Mr. Shonts is a man of unusual decision of character and of marvelous energy. If he could be induced to take hold of constructing the Panama Canal, the work would go and would go right. The

President would be indeed fortunate if he could place this work in charge of a man with the executive ability and vigor of action that Mr. Shonts possesses.

It gives me great pleasure to give this testimony.

I am, dear sir,

Yours very truly,
ROBT. MATHER.

HON. WM. H. TAFT,
Secretary of War,
Washington.

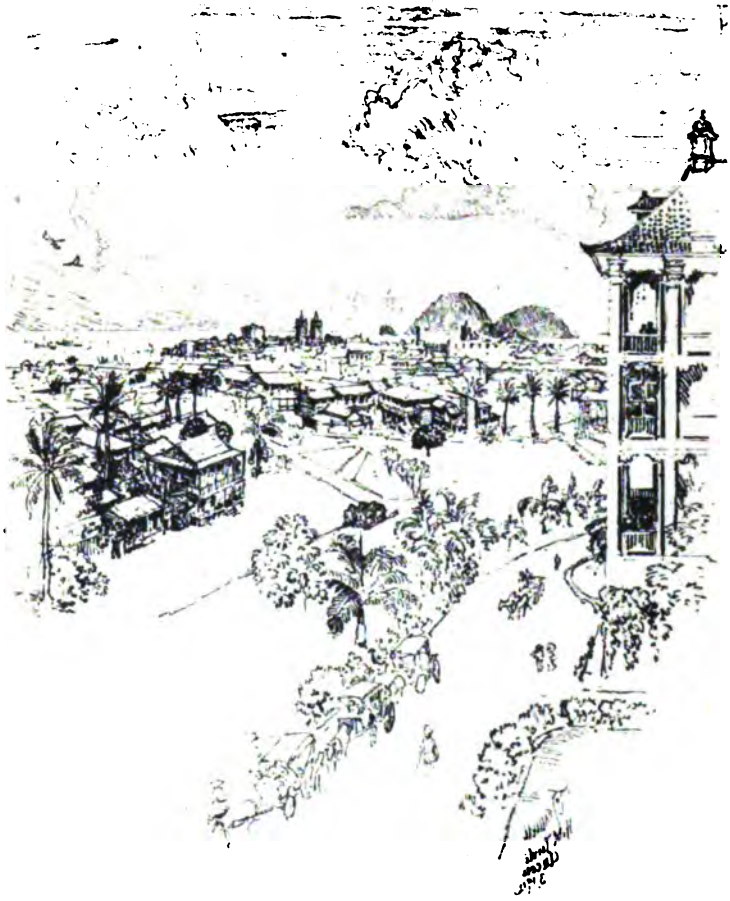
INTERNATIONAL BANKING CORPORATION
1 WALL STREET

NEW YORK, March 21, 1905.

HON. WILLIAM H. TAFT,
Secretary of War,
Washington, D. C.

MY DEAR SIR:

Your confidential letter of March 18th is received to-day. In reply I beg to say that I have known Mr. T. P. Shonts quite intimately for some two years. His character and qualifications have come under my notice while he has been President of the Toledo, St. Louis & Western Railroad Company ("Clover Leaf"), of which I am a director. Of his career previous to this I know only by general reputation. Mr. Shonts is a man of marked ability as an organizer and executive. He has unusual energy and force of character, and quite large experience in managing men. I do not know that he has had large experience in works of construction. From what I know of him I can say that in my opinion he is



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The City of Panama

UNIV. OF MICH.

well qualified for the position you mention, and I say this fully appreciating the magnitude of the responsibility and work involved. I have heard mentioned the names of several other men in connection with the same place. Mr. Shonts, is, I think, the best qualified of any among these. I may add that I should regret to have him leave the "Clover Leaf," in which the interests that I represent are quite large.

Sincerely yours,
T. H. HUBBARD.

41 WALL STREET

NEW YORK, March 20, 1905.

HON. WILLIAM H. TAFT,
War Department.
Washington, D. C.

MY DEAR SIR:

I desire to acknowledge receipt of your favor of the 18th inst., in regard to Mr. T. P. Shonts. In reply would say that I have known Mr. Shonts for about seven or eight years and have always regarded him as a man with a great deal of ability in the construction of railways.

I was originally in a railway proposition with him and we bought the Indiana, Illinois & Iowa Railroad Company, which, at the time, was a small property with limited earning capacity. Mr. Shonts took the Presidency and in fact built it up until it became an important and very prosperous line which he disposed of finally to the Lake Shore Railroad at a very large price.

I believe Mr. Shonts is doing very well with the Clover Leaf now, but of this I am not as familiar.

I have no doubt that Mr. Shonts would be a hard

worker and an able man in the position you mention, but of course my acquaintance with him has been on somewhat different lines.

Trusting that this information is what you desire,
Believe me, dear sir,

Very sincerely yours,
HENRY S. REDMOND.

APPENDIX D

SOME OTHER MEN WHO HELPED

PROMINENT members of the railroad régime who remained until the completion of the Canal were William G. Combes, who had charge of the dredging at the Pacific end of the Canal; Lieutenant (now Captain) Robert E. Wood, U. S. A., who was assistant to Jackson Smith in the Department of Labor and Quarters, and who later on became head of this department under the title of Chief Quartermaster; A. E. Nichols, in charge of plans, maps, and data in the office of the chief engineer; Arthur Sessions, superintendent of transportation in charge of moving the spoil trains from Culebra Cut; Joseph A. Le Prince, chief sanitary engineer under Colonel Gorgas, with practically all the latter's subordinate officers; Dr. James C. Perry, of the Public Health & Marine Hospital Service, as chief quarantine officer; Dr. William E. Deeks and Dr. Alfred B. Herrick, who were the outward and visible symbols of the hospitals to the Canal employees; Thomas M. Cook, of the school, post-office, and revenue services at various times, and scores more holding almost as prominent positions.

Mention should also be made of the efficient work of Edward A. Drake, Vice-President of the Panama Railroad, and Thomas H. Rossbottom, his assistant, both

of whom are now connected with the road and have been from the time it was purchased by the French.

Among others also deserving mention for valuable services rendered at Panama during the railroad régime are Ralph Budd, chief engineer of the Panama Railroad, who on leaving the Isthmus accepted a like position with the Great Northern Railroad, and is now assistant to the president of that corporation; Joseph Ripley, chief engineer of the Sault St. Marie Canal, who was also a member of the consulting board of engineers; George D. Brooks, superintendent of motive power and machinery who continued for two years under the Goethals administration; William M. Belding, builder of bridges and trestles on the Illinois Central Railroad, who was master builder at Panama in charge of construction of hotels, club houses, mess halls, and houses for employees along the line of the Canal; Parker O. Wright, Jr., who designed the type of architecture of those buildings; Charles T. Waring, who was subsequently in charge of construction of the recently opened Cape Cod Canal; H. W. Durham, now chief engineer in charge of highways of the Island of Manhattan, and George R. Shanton, one of Roosevelt's roughriders in the Spanish-American war, who organized the police department of the Canal Zone and became its chief.

The Third Isthmian Commission, which completed the construction of the Canal, with Colonel Goethals as chairman and chief engineer, at a salary of $15,000 per year (one half that paid to Mr. Shonts and Mr. Stevens), had six other members, as had the First and Second Commissions, at $14,000 each per year, who were Major David DuB. Gaillard, U. S. A.; Major William M. Sibert, U. S. A., Civil Engineer, Harry H. Rousseau, U. S. A.,

Joseph C. S. Blackburn, Colonel William C. Gorgas, U.S.A., and Jackson Smith. In the fall of 1908 Jackson Smith was succeeded by Lt.-Col. H. F. Hodges, U.S.A., who became, also, Principal Assistant to Colonel Goethals. In 1910 Joseph C. S. Blackburn was succeeded by Maurice H. Thatcher.

The contemplation of these names and of the following list—The Official Register of the List of Canal Officials Receiving $2000 per annum or more, on June, 1907—will show how complete the organization was which was turned over by the Railroad men to their successors.

OFFICIAL REGISTER OF THE UNITED STATES

VOL. I, 1907

ISTHMIAN CANAL COMMISSION

LIST OF OFFICIALS RECEIVING $2000 PER ANNUM OR MORE

Name	*Official Title*	*Salary*
Lieut.-Col. Geo. W. Goethals, U. S. A.	Chairman	$15,000.00
Maj. David DuB. Gaillard, U. S. A.	Commissioner	14,000.00
Maj. Wm. M. Sibert, U. S. A.	"	14,000.00
Civil Eng. Harry H. Rousseau, U. S. A.	"	14,000.00
Joseph C. S. Blackburn,	"	14,000.00
Col. Wm. C. Gorgas, U. S. A.	"	14,000.00
Jackson Smith,	"	14,000.00

(*Above constitute the new commission.*)

Joseph B. Bishop,	Secretary	$10,000.00
Rufus A. Lane,	Asst. to Secretary	3,600.00
Arthur L. Flint,	Chief of Division	2,000.00
Henry Seymour,	" " "	2,000.00
Ray L. Smith,	" " "	2,000.00
Joseph Ripley,	Designing Engineer	10,000.00
Mortimer G. Barnes,	Assistant Engineer	6,000.00
Henry Goldmark,	" "	6,000.00
Edward Schildhauer,	" "	5,000.00

Name	*Official Title*	*Salary*
David A. Molitor,	Assistant Engineer	$3,600.00
Edward B. Harden,	Chief Draftsman	2,500.00
Ernest S. Benson,	General Auditor	10,000.00
Harry C. Lewis,	Deputy Auditor	2,800.00
James G. Jester,	Disbursing Officer	3,600.00
Virgil C. Miller,	Chief Clerk	2,000.00
David W. Ross,	General Purchasing Officer	12,000.00
Charles E. Dole,	Chief Clerk	2,000.00
Richard R. Rogers,	General Counsel	8,000.00
William P. Armstrong,	Law Clerk	2,400.00
Samuel E. Redfern,	Asst. Purchasing Agt., N. O., La.	2,200.00
Fritz H. Haradon,	Asst. Purchasing Agt., Tacoma, W.	2,000.00
LeRoy Park,	Recruiting Officer, Europe	3,660.00
William G. Shea,	Recruiting Officer, New York	3,000.00
Henry A. Smith,	Recruiting Officer, So. States	3,000.00
Joseph A. Steltenkamp,	Recruiting Officer, Central States	3,000.00
Truman M. Post,	Inspector of Dredges, Sparrow Pt., Maryland	3,000.00
CANAL ZONE		
F. Mutis Duran,	Chief Justice, Ancon	6,500.00
Lorin C. Collins,	Asso. Justice, Cristobal	6,000.00
H. A. Gudger,	" " Ancon	6,000.00
George McF. Shontz,	Prosecuting Attorney	6,000.00
Walter Emery,	Clerk of Court, Ancon	2,000.00
Elbert M. Goolsby,	" " " Empire	2,000.00
Nelson R. Johnson,	" " " Cristobal	2,000.00
ANCON		
Joseph G. Holcombe,	Division Engineer	7,500.00
Ricardo M. Arango,	" "	4,200.00

Name	*Official Title*	*Salary*
James M. Maguire,	Superintendent	$3,000.00
William F. Ashton,	Supervisor of Pumps	2,100.00
Charles Bertoncini,	Chief of Div. of Map Making	3,000.00
Harry C. Bovay,	Chief Clerk	2,400.00
Daniel W. MacCormack,	" "	2,400.00
Earle C. McFarland,	" "	2,400.00
William C. Haskins,	" "	2,100.00
Donald E. McDonald,	" "	2,100.00
Joseph A. McGuigan,	" "	2,100.00
George A. Ninas,	" "	2,100.00
Charles Parker,	" "	2,100.00
Joseph McD. Sinclair,	" "	2,100.00
John J. Moran,	Clerk	2,040.00
James C. Perry, P.H. and M.H.S.	Chief Quarantine Officer	7,000.00
Fleetwood Gruver,	Quarantine Officer	3,000.00
Maj. Champe C. McCulloch, Jr., U. S. A.	Executive Officer	4,875.00
Henry R. Carter, P.H. and M.H.S.	Director of Hospitals	8,000.00
Maj. John L. Phillips, U. S. A.	Supt. of Hospitals	7,000.00
William E. Deeks,	Chief of Clinic	4,500.00
Alfred B. Herrick,	" " "	4,500.00
Capt. Theodore C. Lyster, U. S. A.	Surgeon	4,500.00
Capt. Geo. H. Crabtree, U. S. A.	"	3,300.00
Capt. Robt. E. Noble, U. S. A.	Asst. Surgeon	3,300.00
John P. Bates,	Physician	3,000.00
Harry T. Summersgill,	"	3,000.00
Charles G. Andrews,	"	2,400.00
Taylor E. Darby,	"	2,400.00
Lieut. Alexander Murray, U. S. A.	"	2,400.00

Name	*Official Title*	*Salary*
Charles Eaton Phillips,	Physician	$2,400.00
Walter V. Brem,	Pathologist	3,000.00
Geo. H. Whipple,	"	2,400.00
Thomas Ross Brown,	Bacteriologist	2,400.00
Ralph W. Nauss,	Chemist	2,400.00
Samuel T. Darling,	Chief of Laboratory	4,000.00
Samuel H. Caldwell,	Veterinary Surgeon	2,400.00
John Pippert,	Superintendent of Laundry	2,100.00
Joseph A. Le Prince,	Chief Sanitary Inspector	5,000.00
Herman Canfield,	Sanitary Inspector	2,400.00
William J. Murphy,	" "	2,100.00
Harry D. Reed,	Executive Secretary	3,600.00
George L. Campen,	Supt. of Public Works	4,000.00
George R. Shanton,	Chief of Police	4,000.00
Lieut. Stanley S. Ross, U. S. A.	Police Officer	2,475.00
David C. O'Connor,	Supt. of Schools	2,500.00
Thomas M. Cooke,	Collector of Revenues	5,000.00
E. Lewis Baker,	Deputy Collector of Revenues	2,400.00
Herman A. Gudger,	Deputy Collector of Revenues	2,100.00
William Krugel,	Stationer and Printer	2,400.00
Bas Obispo		
Frederick L. Hartigan,	Superintendent	3,600.00
James W. Sneed,	Asst. Superintendent	3,000.00
Leslie G. Thom,	" "	2,400.00
Clement Walker,	Supervisor	2,400.00
J. Walter McMorrow,	Instrumentman	2,100.00
Daniel E. Wright,	"	2,100.00
Alfred R. James,	Topographical Draftsman	2,100.00
J. A. Van Hardeveld,	Foreman	2,400.00

Name	*Official Title*		*Salary*
William R. McCord,	Foreman		$2,100.00
Emile Robichaux,	Steam-shovel Engineer	pm	226.80
Arthur O. Blake,	" " "	"	220.50
Thomas Flanagan,	" " "	"	220.50
C. W. Hayden,	" " "	"	220.50
G. G. McNamara,	" " "	"	220.50
Edward Moore,	" " "	"	220.50
William G. Russell,	" " "	"	220.50
Thomas Cummings,	" " "	"	210.00
Ernest Dove,	" " "	"	210.00
Peter Greenidge,	" " "	"	210.00
Edward Norris,	" " "	"	210.00
William H. Farrell,	Locomotive Engineer	"	199.50
Thomas Finley,	" "		190.00
Howard E. Megee,	" "	"	190.00
Donald Gorden,	Steam-shovel Crane-man	"	194.25
James L. Hummer,	Steam-shovel Crane-man	"	194.25
James Laird,	Steam-shovel Crane-man	"	194.25
H. W. Steinbaugh,	Steam-shovel Crane-man	"	194.25
William S. Campbell,	Steam-shovel Crane-man	"	185.00
Joe Ashby Evans,	Steam-shovel Crane-man	"	185.00
Achilles E. Foley,	Steam-shovel Crane-man	"	185.00
John H. Freel,	Steam-shovel Crane-man	"	185.00
Horace E. Ramsay,	Steam-shovel Crane-man	"	185.00
Edward L. Reed,	Yardmaster	"	190.00
Albert M. Dickinson,	Conductor	"	170.00
Thomas L. Keeler,	"	"	170.00
Frank S. McAllister,	"	"	170.00
Bert W. Caldwell,	Physician		3,000.00

COLON

Name	*Official Title*	*Salary*
Surg. James F. Leys, U. S. A.	Supt. of Hospitals	$5,000.00
Claude C. Pierce, P.H. and M.H.S.	Quarantine Officer	4,400.00

COROZAL

Thomas O'Brien,	Superintendent	2,100.00

CRISTOBAL

Walter G. Tubby,	Chief of Div. of Material & Supplies		10,000.00
Guion V. Barrie,	Asst. Engineer		2,700.00
Charles W. Beattie,	" "		2,700.00
Reynolds B. Smith,	Resident Engineer		2,700.00
Franklin W. Hart,	Instrumentman		2,100.00
C. L. Vandeburgh,	"		2,100.00
Ephraim C. Claybourn,	Superintendent		3,000.00
Edgar Vance,	"		3,000.00
Frank L. Cornish,	"		2,400.00
Isaac E. Goldman,	"		2,100.00
William H. Storm,	Supervisor		2,700.00
William F. Christian,	"		2,100.00
Russell D. Coulter,	"		2,100.00
DeWitt C. Vance,	"		2,100.00
Marcy H. Carpenter,	Lumber Foreman		2,100.00
Jay M. Smith,	Foreman		2,100.00
Ludwig A. Helliksen,	Master of Dredge	pm	225.00
Walter J. White,	Engineer of Dredge	"	226.80
August Johnson,	" " "	"	175.00
W. H. Black,	Steam-shovel Craneman	"	194.25
James L. Humphreys,	Steam-shovel Craneman	"	194.25
Max Dyer,	Chief Clerk		3,300.00
John J. Jackson,	" "		2,880.00
Charles E. Kendall,	" "		2,400.00

Name	*Official Title*	*Salary*
Harry Leonard,	Chief Clerk	$2,400.00
Edwyn N. Purvis,	" "	2,100.00
Frank P. Wright,	" "	2,100.00
Paul Wuttke,	" "	2,100.00
Matthew A. Follman,	Private Secretary	2,100.00
Frederick Guerian,	Clerk	2,100.00
Michael Delevante,	Inspector of Accounts	2,100.00
Marie P. G. Marbotin,	Accountant	2,100.00
Marquis L. Robb,	"	2,100.00
William A. Graham,	Storekeeper	2,500.00
Edward DeVoe Hammond,	"	2,500.00
Claude C. Pierce,	Quarantine Officer	4,400.00
Michael E. O'Connor,	Health Officer	3,600.00
Charles E. Weideman,	Chief of Fire Department	2,500.00
CULEBRA		
Sydney B. Williamson,	Division Engineer	7,500.00
Earle J. Banta,	Mechanical Engineer	5,000.00
Lorenzo D. Cornish,	Designing Engineer	4,200.00
Herman F. Tucker,	" "	4,200.00
Auvin B. Nichols,	Office Engineer	3,600.00
Eugen Steffan, Jr.,	Computing Engineer	2,100.00
Edgar L. Wilson,	Instrumentman	2,100.00
William L. Belding,	Master Builder	6,000.00
Parker O. Wright, Jr.,	Architect	3,600.00
Samuel L. Hitt,	Draftsman	2,700.00
Ludwig T. Maenner,	"	2,700.00
Edward J. Lanster,	"	2,400.00
William S. Bucknell,	"	2,100.00
Walter L. G. Perry,	Topographical Draftsman	2,100.00
George D. Brooks,	Supt. of Motive Pow. and Machinery	7,500.00
McClelland K. Jones,	Supt. of Transportation	5,000.00
James Monahan,	Supt. of Air Compressors	4,200.00

Name	*Official Title*	*Salary*
Joseph Little,	Superintendent	$4,200.00
J. Fernando Wickham,	"	2,700.00
Collins P. Gibson,	Assistant Superintendent	3,000.00
M. J. McDonough,	Assistant Superintendent	3,000.00
Homer Kinsman,	Assistant Superintendent	2,100.00
Patrick J. Joyce,	Supervisor	2,700.00
F. Stanley Atwood,	"	2,100.00
James P. Kirk,	"	2,100.00
John Atkins,	Foreman	2,268.00
Philip A. Biesen,	"	2,100.00
Isaac Ocum,	"	2,100.00
Robert E. Lindsay,	Boiler Inspector	3,300.00
B. F. Linton,	Asst. Boiler Inspector	2,100.00
James Hall Averill,	Steam-shovel Engineer pm	226.80
George Buchan,	" " " "	226.80
Daniel F. Donahue,	" " " "	226.80
William H. Holcombe,	" " " "	226.80
Joseph S. Kirk,	" " " "	226.80
J. J. Meehan,	" " " "	226.80
Warren A. Ritter,	" " " "	226.80
David L. Small,	" " " "	226.80
A. E. Erickson,	" " " "	220.50
Allen D. Fisher,	" " " "	220.50
William Gerow,	" " " "	220.50
Patrick J. McDonald,	" " " "	220.50
William J. McGovern,	" " " "	220.50
Michael E. Nolan,	" " " "	220.50
Thomas M. Collins,	" " " "	210.00
Ralph N. Crowell,	" " " "	210.00
John L. Davies,	" " " "	210.00
Frank J. Kelley,	" " " "	210.00
Daniel J. McDonald,	" " " "	210.00
Frank H. Meisner,	" " " "	210.00
Robert G. Noon,	" " " "	210.00
Eugene M. Pullen,	" " " "	210.00
Georges H. Searles,	" " " "	210.00

Name	*Official Title*		*Salary*
Henry S. Stratton,	Steam-shovel Engineer	pm	$210.00
Charles Strong,	" " "	"	210.00
Robert W. Wheeler,	" " "	"	210.00
Charles R. Campbell,	Locomotive Engineer	"	199.50
Michael A. Griley,	" "	"	199.50
D. Madden,	" "	"	199.50
Richard Conley,	" "	"	190.00
William H. Conley,	" "	"	190.00
George L. Griley,	" "	"	190.00
John H. Kane,	" "	"	190.00
Joshua W. Kendall,	" "	"	190.00
Phillip Taylor,	" "	"	190.00
George W. Watson,	" "	"	190.00
William I. Barnes,	" "	"	180.00
Fred B. Bryan,	" "	"	180.00
Frank W. Greason,	" "	"	180.00
Robert Somerville,	" "	"	180.00
Arthur E. Walker,	" "	"	180.00
Albert H. Geddess,	Steam-shovel Crane-man	"	199.80
William H. Walsh,	Steam-shovel Crane-man	"	199.80
John H. Cole,	Steam-shovel Crane-man	"	194.25
Alonzo Admonson,	Steam-shovel Crane-man	"	194.25
J. F. Kelleher,	Steam-shovel Crane-man	"	194.25
John I. Major,	Steam-shovel Crane-man	"	194.25
Joseph L. Sherman,	Steam-shovel Crane-man	"	194.25
R. Earle Besley,	Steam-shovel Crane-man	"	185.00
Jerry Cannon,	Steam-shovel Crane-man	"	185.00
William E. Collins,	Steam-shovel Crane-man	"	185.00

Name	*Official Title*		*Salary*
Charles G. Gallagher,	Steam-shovel Craneman	pm	$185.00
John McCoy Garvin,	Steam-shovel Craneman	"	185.00
Robert McDermott,	Steam-shovel Craneman	"	185.00
James O. McKee,	Steam-shovel Craneman	"	185.00
Frank W. Mutzabaugh,	Steam-shovel Craneman	"	185.00
James A. Nolan,	Steam-shovel Craneman	"	185.00
Charles P. Ryan,	Steam-shovel Craneman	"	185.00
Ephraim Stein,	Steam-shovel Craneman	"	185.00
Dan Tierney,	Steam-shovel Craneman	"	185.00
William P. Wheeler,	Steam-shovel Craneman	"	185.00
John F. Wood,	Steam-shovel Craneman	"	185.00
A. K. Stone,	Trainmaster		3,000.00
Randall T. Bradberry,	Yardmaster	pm	199.50
Joseph T. Woods,	"	"	199.50
Christopher O. Wheeler,	"	"	190.00
William H. Bryant,	"	"	180.00
William M. Bower,	Conductor	"	190.00
Noel Guerini,	"	"	180.00
Robert J. Harvey,	"	"	180.00
Elias C. Tinsley,	"	"	180.00
Christopher B. West,	"	"	180.00
Walter L. Kaynor,	"	"	170.00
Donald L. Shirley,	"	"	170.00
Quenton Sorrell,	"	"	170.00
Lt. Robt. E. Wood, U. S. A.	Assistant Manager		4,000.00
A. Bruce Minear,	Supt. of Club Houses		2,400.00

Name	*Official Title*	*Salary*
William Howard May,	Secretary to the Chairman	$3,600.00
Maurice K. De Putron,	Chief Clerk	3,600.00
Frank W. Doty,	" "	2,700.00
John H. Barbour,	" "	2,400.00
Samuel C. Klauber,	" "	2,400.00
Robert M. Sands,	" "	2,400.00
Albert C. Griggs,	Clerk	2,100.00
James B. Huff, Jr.,	"	2,100.00
Benjamin L. Jacobson,	"	2,100.00
William M. McCoy,	"	2,100.00
Cloyd A. McIlvaine,	"	2,100.00
Frank E. Moore,	"	2,100.00
Albert C. Logan,	Supervisor of Accounts	2,100.00
Emile S. Hulen,	Accountant	2,100.00
Fred Larsen,	"	2,100.00
Sumner Coolidge,	Physician	3,000.00
Allen B. Tucker,	Sanitary Inspector	2,100.00
	Empire	
D. W. Bolick,	Division Engineer	7,500.00
Louis K. Rourke,	Asst. Div. Engineer	6,000.00
A. S. Zinn,	Resident Engineer	3,600.00
George H. Ruggles,	Assistant Engineer	3,000.00
M. W. Tenny,	" "	3,000.00
W. L. Thompson,	" "	3,000.00
William McC. Acheson,	" "	2,700.00
C. L. Davis,	Transitman	2,100.00
Dan E. Crowley,	Superintendent	3,600.00
E. E. Rigney,	Assistant Superintendent	3,000.00
Arthur Sessions,	Assistant Superintendent	3,000.00
W. D. Waltman,	Assistant Superintendent	3,000.00
Curtis C. McColley,	Assistant Superintendent	2,400.00

Name	*Official Title*	*Salary*
George W. Greer,	Assistant Superintendent	$2,220.00
Bertrand J. O'Mealy,	Compressor Engineer	2,100.00
William H. Bates,	Inspector	2,700.00
John J. Reidy,	"	2,400.00
Albert Loveless,	"	2,100.00
James Nugent,	"	2,100.00
Charles A. Crowell,	Traveling Inspector	2,100.00
L. A. O'Neal,	Supervisor	2,100.00
Bernell C. Poole,	"	2,000.00
Edward B. Connor,	Foreman	2,700.00
John H. Moriarity,	"	2,700.00
E. Gordon Campbell,	"	2,400.00
Charles O. Dickerson,	"	2,400.00
Sherman G. Forbes,	"	2,400.00
Harry G. Gallagher,	"	2,400.00
Ralph Gardiner,	"	2,400.00
Charles Harris,	"	2,400.00
William A. Howson,	"	2,400.00
William W. Lindsay,	"	2,400.00
Edward C. Miller,	"	2,400.00
Charles Oettley,	"	2,400.00
Thomas C. Atterbury,	"	2,100.00
George A. Brown,	"	2,100.00
Harry T. Coffey,	"	2,100.00
August Kull,	"	2,100.00
Phillip M. Lowe,	"	2,100.00
George W. Lumby,	"	2,100.00
Walter E. Marks,	"	2,100.00
John L. Powderly,	"	2,100.00
James Seiton	"	2,100.00
Clinton O. Simmons,	"	2,100.00
Fred M. Spaulding,	"	2,100.00
William H. Berg,	"	2,040.00
Peter Fraron,	"	2,040.00
Charles H. Mead,	Master Car Builder	3,600.00
Frank W. Miracle,	Storekeeper	2,500.00
Daniel J. Kelley,	Powderman	2,100.00

Name	*Official Title*		*Salary*
William Bodette,	Steam-shovel Engineer	pm	$226.80
Frank Loulan,	" " "	"	226.80
Patrick F. Maher,	" " "	"	226.80
Edward E. Stewart,	" " "	"	226.80
George H. Dawson,	" " "	"	220.50
William J. Ergenzinger,	" " "	"	220.50
Charles M. Wilson,	" " "	"	220.50
James H. Agnew,	" " "	"	210.00
John Dailey,	" " "	"	210.00
Luther M. Forsythe,	" " "	"	210.00
Thomas Dailey,	" " "	"	210.00
Dominico Langro,	" " "	"	210.00
Samuel I. Lyons,	" " "	"	210.00
John Maher,	" " "	"	210.00
Aaron O. Mason,	" " "	"	210.00
Stephen H. Pode,	" " "	"	210.00
Walter S. Browning,	Locomotive Engineer	"	190.00
William F. Polk,	" "	"	190.00
William L. Titus,	" "	"	190.00
Walter C. Woodson,	" "	"	190.00
Edward G. Bath,	" "	"	180.00
Harry W. Bruck,	" "	"	180.00
Marcellus A. Heath,	" "	"	180.00
Zan Murphy,	" "	"	180.00
Charles W. Thompson,	" "	"	180.00
Warren Nupp,	" "	"	180.00
John B. Coyne,	Steam-shovel Craneman	"	199.80
Paul R. Arndt,	Steam-shovel Craneman	"	194.25
Benoni E. Holcomb,	Steam-shovel Craneman	"	194.25
Thomas McGibney,	Steam-shovel Craneman	"	194.25
Michael Flaherty,	Steam-shovel Craneman	"	185.00
John G. Hahn,	Steam-shovel Craneman	"	185.00

Name	*Official Title*		*Salary*
H. S. Hayes,	Steam-shovel Crane-man	pm	$185.00
Henry A. Moore,	Steam-shovel Crane-man	"	185.00
C. K. Rudy,	Steam-shovel Crane-man	"	185.00
Harvey E. Whyde,	Steam-shovel Crane-man	"	185.00
Arthur Willman,	Steam-shovel Crane-man	"	185.00
Clarence Wilson,	Steam-shovel Crane-man	"	185.00
Harry C. Wertz,	Yardmaster	"	225.00
William H. Alexander,	"	"	199.50
Harry Girdner,	"	"	190.00
Fred G. Kuehnle,	Wreck Foreman	"	170.00
Elliott L. Hall,	Conductor	"	170.00
Fred Hallowell,	"	"	170.00
James R. Keeling,	"	"	170.00
Ortez G. Randall,	"	"	170.00
Richard Stoge,	"	"	170.00
Edward J. Williams,	Disbursing Officer		7,860.00
John P. Waldrop,	Cashier		3,100.00
John A. Embry,	Paymaster		2,500.00
Clarence E. Gilmore,	"		2,500.00
Christopher C. Metcalf,	"		2,500.00
Edgar P. Beck,	Pay Clerk		2,200.00
James H. Baxter,	" "		2,100.00
Albert P. de Veyriere,	" "		2,100.00
Joseph Page,	" "		2,100.00
Edward F. Deeds,	" "		2,000.00
Roscoe Rainwater,	" "		2,000.00
Harley L. Stuntz,	Auditor		4,500.00
Robert W. Glaw,	Accountant		2,400.00
C. E. Anderson,	"		2,100.00
Jacob C. Forman,	"		2,100.00
Harry A. Haywood,	"		2,100.00
Emile Lepiez,	"		2,100.00

Name	*Official Title*	*Salary*
Felix E. Porter,	Accountant	$2,100.00
Eugene H. Ash,	"	2,000.00
M. L. Duff,	"	2,000.00
Joseph C. Wood,	"	2,000.00
William M. Wood,	Chief Clerk	3,600.00
Syd. J. Kennedy,	" "	3,000.00
William D. Mabry,	" "	2,400.00
Charles T. Schrvegler,	" "	2,400.00
Charles S. Todd,	Chief of Division	2,400.00
A. Earl Brouk,	Clerk	2,100.00
Milton S. Hathaway,	"	2,000.00
John H. McLean,	"	2,000.00
Perry B. Preston,	Physician	2,400.00
GATUN		
William Gerig,	Division Engineer	6,600.00
Charles L. Carpenter,	Resident Engineer	3,600.00
Sledge Tatum,	Assistant Engineer	3,000.00
George M. Wells,	" "	3,000.00
John O. Taylor,	" "	2,700.00
Thomas F. Boltz,	" "	2,400.00
Howard R. Clark,	" "	2,400.00
Ralph D. Geraty,	" "	2,400.00
Herman K. Higgins,	" "	2,400.00
Louis Broome,	Instrumentman	2,100.00
James W. Hortenstine,	"	2,100.00
Natt M. Johnson,	"	2,100.00
Frank W. Stephens,	"	2,100.00
John Hayes,	Superintendent	3,300.00
E. O. Keater,	Supervisor	2,700.00
Joseph V. Doyle,	"	2,100.00
James W. McGrath,	"	2,100.00
Howard M. Reid,	"	2,100.00
James C. Wilson,	Inspector	2,100.00
John Savage,	Steam-shovel Engineer pm	220.50
Charles Stoddard,	" " " "	220.50
A. H. Gray,	" " " "	210.00
Gust Meisner,	" " " "	210.00

Name	*Official Title*				*Salary*
Samuel M. Perkins,	Steam-shovel	Engineer		pm	$210.00
Benjamin F. Poole,	"	"	"	"	210.00
Lewis P. Stenley,	"	"	"	"	210.00
Louis Talbot,	"	"	"	"	210.00
Hugh Weldon,	"	"	"	"	210.00
Frank E. Shuck,	Locomotive	Engineer		"	220.50
Stansbury B. Adkins,	"	"		"	210.00
Edward G. Bath,	"	"		"	210.00
Charles W. Cooper,	"	"		"	210.00
William Fetters,	"	"		"	210.00
Allison H. Housel,	"	"		"	210.00
George Hudson,	"	"		"	210.00
Arthur J. Pipher,	"	"		"	210.00
Frank Rivers,	"	"		"	210.00
George Stewart,	"	"		"	210.00
Frederick M. Baker,	"	"		"	180.00
Willis R. Cole,	"	"		"	180.00
Llewellyn E. Jones,	"	"		"	180.00
Peter Nelson,	Steam-shovel	Crane-man		"	199.80
George H. Watts,	Steam-shovel	Crane-man		"	199.80
Thomas Daley,	Steam-shovel	Crane-man		"	194.25
Clarence O. Hobson,	Steam-shovel	Crane-man		"	185.00
Robert J. Loving,	Steam-shovel	Crane-man		"	185.00
George Lytle,	Steam-shovel	Crane-man		"	185.00
Joseph Paris,	Steam-shovel	Crane-man		"	185.00
Sam Shelato,	Steam-shovel	Crane-man		"	185.00
Charles Simonson,	Steam-shovel	Crane-man		"	185.00
N. C. Storey,	Steam-shovel	Crane-man		"	185.00

Name	*Official Title*		*Salary*
Richard Stage,	Conductor	pm	$199.80
George P. Ball,	"	"	190.00
Jerome M. Cavanaugh,	"	"	190.00
Charles C. Clark,	"	"	190.00
Andrew Decker,	"	"	190.00
Alphonsus L. Kerr,	"	"	190.00
Henry F. Kildea,	"	"	190.00
Edward Foley,	"	"	170.00
Hugh J. McQuade,	"	"	170.00
George W. Peirce,	"	"	170.00
Charles E. Robinson,	"	"	170.00
Edgar P. Thompson,	Clerk		2,100.00
GORGONA			
E. C. Cummings,	Master Mechanic		4,500.00
Alanson D. Morehouse,	Draftsman		2,100.00
Charles L. Parker,	Superintendent		3,000.00
Henry E. Daly,	"		2,700.00
Stanley D. Morgan,	"		2,700.00
S. F. De Montmorency,	Supervisor		2,400.00
Thomas O'Connell,	"		2,294.00
Anthony T. Corcoran,	Foreman	pm	250.00
John J. Eason,	"	"	250.00
John E. Fogerty,	"	"	225.00
Harry B. Mattimore,	"	"	225.00
Robert Bailey,	"	"	200.00
Frank B. Ferebee,	"	"	200.00
Orin H. Kunce,	"	"	200.00
John L. Little,	"	"	200.00
Marco Reges,	"	"	200.00
Edward Boyle,	"	"	175.00
Jesse B. Brown,	"	"	175.00
Lyman Cole,	"	"	175.00
Alva C. Everist,	"	"	175.00
Samuel L. Lux,	"	"	175.00
Claude Metzger,	"	"	175.00
John A. O'Connor,	"	"	175.00

Name	*Official Title*		*Salary*
Asa H. Shuff,	Foreman	pm	$175.00
Arthur J. Sweet,	"	"	175.00
Charles F. Williams,	"	"	175.00
Richard W. Wilson,	"	"	175.00
R. F. Bowlby,	Locomotive Engineer	"	190.00
Jeremiah Foley,	" "	"	190.00
James O'Neil,	" "	"	190.00
Harry W. Bernington,	" "	"	180.00
John J. Bridges,	" "	"	180.00
Thomas Langston,	" "	"	180.00
Ransome Payle,	" "	"	180.00
George H. Potts,	" "	"	180.00
Oscar A. Sandberg,	Stationary Engineer	"	175.00
Edward H. Allison,	Yardmaster	"	190.00
Wilson O. Breneman,	"	"	190.00
Mose H. Gilliman,	"	"	190.00
Samuel A. Jones,	Conductor	"	180.00
Leslie W. Locke,	"	"	180.00
Henry Muller,	"	"	170.00
Clarence L. Prentiss,	Storekeeper		2,500.00
Harvey C. Dew,	Clerk		2,100.00
William F. Smith,	Physician		3,600.00
Frank R. Curney,	"		2,400.00
Edward W. Mitchell,	Sanitary Inspector		2,100.00
La Boca			
William G. Comber,	Division Engineer		5,000.00
Austin C. Harper,	Resident Engineer		3,600.00
William B. Ruggles,	" "		3,300.00
Frank Cotton,	Instrumentman		2,100.00
Alexander McL. Miller,	Surveyor		2,100.00
James Macfarlane,	Supt. of Floating Equipment		3,300.00
William T. Reynolds,	Assistant Superintendent		3,000.00
William C. Gayer,	Supervisor		2,100.00
Charles P. Allen,	"		2,000.00

Name	*Official Title*		*Salary*
Hugh McKay,	Foreman		$2,400.00
Lawrent Roquebert,	"		2,000.00
Edward F. Jennings,	Machinist		2,100.00
John D. Wilson.	Diamond Drill Setter		2,100.00
John F. Lewis,	Locomotive Engineer	pm	220.50
Alfred E. Rogers,	" "	"	199.50
George Darling,	" "	"	190.00
John F. Brown,	" "	"	180.00
David J. Cooper,	" "	"	180.00
George Lampkin,	" "	"	180.00
William McHugh,	" "	"	180.00
Frederick O. Medinger,	" "	"	180.00
Bertham F. Rowland,	" "	"	180.00
George R. Dempster,	Steam-shovel Crane-man	"	185.00
Roy McCandless,	Steam-shovel Crane-man	"	180.00
George J. French,	Yardmaster	"	190.00
Frank J. McKay,	Conductor	"	185.00
Herbert H. Howe,	"	"	180.00
Samuel P. Darrow,	Dredge Master	"	210.00
Henry H. Hancock,	" "	"	210.00
Lorenzo C. Vannah,	Storekeeper		2,100.00
Edward A. LeMay,	Chief Clerk		2,100.00
David V. Stratton,	" "		2,100.00

LAS CASCADAS

Frederick P. Purschurtz,	Foreman		2,400.00
Charles L. Thorne,	Supervisor		2,100.00
Alexander Dombrowsky,	Compressor Engineer		2,100.00
Claude C. Fagan,	Steam-shovel Engineer	pm	194.25
John Foose,	Locomotive Engineer	"	190.00
Frank E. Day,	" "	"	199.50
Otto Hammel,	" "	"	199.50
Fred O. Metzger,	" "	"	199.50
John H. Ball,	" "	"	190.00
Jasper H. Bruner,	" "	"	190.00

Name	*Official Title*			*Salary*
William C. Jones,	Locomotive Engineer		pm	$190.00
Alfred W. Lawton,	"	"	"	190.00
Orren Logan,	"	"	"	190.00
J. Marion Matchette,	"	"	"	190.00
William H. Perry,	"	"	"	190.00
Elwin J. Sampson,	"	"	"	190.00
Frederick W. Scales,	"	"	"	190.00
Ernest R. Thompson,	"	"	"	190.00
John J. Bridges,	"	"	"	180.00
Walter G. Ford,	"	"	"	180.00
Robert S. Gill,	"	"	"	180.00
Elwood J. Sampson,	"	"	"	180.00
Virgil W. Ashbaugh,	"	"	"	180.00
John Bingham,	"	"	"	180.00
Frank L. Crosby,	"	"	"	180.00
John Condon,	"	"	"	180.00
J. G. Craig,	"	"	"	180.00
John P. Doyle,	"	"	"	180.00
Warren D. Drepdale,	"	"	"	180.00
Mark V. Enright,	"	"	"	180.00
Edward D. Hoadley,	"	"	"	180.00
William H. Housel,	"	"	"	180.00
Samuel Hutton,	"	"	"	180.00
Howell Jones,	"	"	"	180.00
George B. Lingle,	"	"	"	180.00
Matthew J. Lough,	"	"	"	180.00
John E. McCord,	"	"	"	180.00
Arthur J. McGowan,	"	"	"	180.00
William W. McRoberts,	"	"	"	180.00
Benjamin F. Mudgett,	"	"	"	180.00
Frederick W. Newnham,	"	"	"	180.00
Frank M. Rainey,	"	"	"	180.00
John L. Reese,	"	"	"	180.00
John E. Shaw,	"	"	"	180.00
John E. Sullivan,	"	"	"	180.00
Harry Vanderberg,	"	"	"	180.00
Harry H. Veall,	"	"	"	180.00
L. Dean Thorpe,	"	"	"	180.00

Name	*Official Title*		*Salary*
Francis W. Walraven,	Locomotive Engineer	pm	$180.00
Thomas G. Williamson,	" "	"	180.00
Fred Beyer,	Steam-shovel Craneman	"	185.00
Michael C. Cavanaugh,	Steam-shovel Craneman	"	185.00
William Knapp,	Steam-shovel Craneman	"	185.00
Albert T. Valentine,	Yardmaster	"	215.00
Wm. H. Boregard,	"	"	187.00
Eugene B. Hill,	Conductor	"	180.00
John W. Houchin,	"	"	180.00
Herbert S. Leassenhop,	"	"	180.00
William Weitz,	"	"	180.00
Charles C. Barnett,	"	"	170.00
James Berry,	"	"	170.00
Clarence W. Dilfill,	"	"	170.00
Joseph B. Grinder,	"	"	170.00
Frank Knight,	"	"	170.00
Joseph McCormick,	"	"	170.00
James W. Murphy,	"	"	170.00
Samuel Peel,	"	"	170.00
Gottlieb F. Richards,	"	"	170.00
Robert Robinson,	"	"	170.00
Rupert P. Ward,	"	"	170.00
Miraflores			
Ignatius D. Loewy,	Physician		2,400.00
Harry E. Mereness, Jr.,	"		2,400.00
Panama			
William I. Baucus,	Assistant Engineer		2,700.00
James Stokoe,	Testing Engineer		2,100.00
Charles T. Waring,	Instrumentman		2,100.00
Robert Coe,	Topographical Draftsman		2,100.00
Malcolm Elliott,	Hydrographer		2,100.00

Name	*Official Title*			*Salary*
Charles L. Stockelberg,	Supt. of Plumbing			$2,700.00
William F. Ashton,	Supervisor			2,100.00
Rene G. Castel,	Time Clerk			2,100.00
Asst. Surg. Francis M. Shook, U. S. A.,	Physician			2,600.00
Harry Eno,	"			2,400.00
Emmett I. Vaughn,	"			2,400.00
Edward M. Fechtig,	Paymaster			2,000.00
PARAISO				
Edward C. Harington,	Master Mechanic			3,900.00
Julius D. Stevens,	" "			3,300.00
William H. Morse,	Supervisor			2,700.00
John H. Gebhardt,	Foreman			2,700.00
William J. Blount,	"			2,400.00
Joseph V. Casey,	"			2,400.00
Harry F. Cody,	"			2,400.00
George E. Kirk,	"			2,400.00
William Culkin,	"			2,100.00
Eugene A. Hendricks,	"			2,100.00
Percy C. Wass,	"			2,100.00
Robert Leftwich,	Steam-shovel Engineer		pm	220.50
Wallace R. Wright,	" " "		"	210.00
Joy R. Barnes,	Locomotive Engineer		"	190.00
George Brown,	"	"	"	190.00
William T. Dozier,	"	"	"	190.00
Grant Key,	"	"	"	190.00
Henry Montgomery,	"	"	"	190.00
Willoughby M. Taylor,	"	"	"	190.00
Ord Bagerstock,	"	"	"	180.00
Andrew H. Bearup,	"	"	"	180.00
Will C. Blakeman,	"	"	"	180.00
James C. Casper,	"	"	"	180.00
Edmund T. Costello,	"	"	"	180.00
William H. Falkner,	"	"	"	180.00
James A. Fowell,	"	"	"	180.00
Edward B. Healey,	"	"	"	180.00
Kemp G. Jones,	"	"	"	180.00
Frank Kosier,	"	"	"	180.00

Name	*Official Title*		*Salary*
Daniel McGraw,	Locomotive Engineer	pm	$180.00
Thomas C. McLaughlin,	" "	"	180.00
Andrew N. Naylor,	" "	"	180.00
Charles R. Ray,	" "	"	180.00
Earnest A. Repp,	" "	"	180.00
William A. Sarvey,	" "	"	180.00
Frank Schuermyer,	" "	"	180.00
Edward Ulrich,	" "	"	180.00
Delbert W. Wilbur,	" "	"	180.00
Phillip F. Kramer,	" "	"	170.00
Hugh W. Davis,	Steam-shovel Crane-man	"	185.00
Ralph Long,	Steam-shovel Crane-man	"	185.00
James C. Barnett,	Yardmaster	"	187.00
Edgar H. Deer,	Conductor	"	199.50
John M. Carroll,	"	"	180.00
Charles W. Ebert,	"	"	180.00
Mark Eagan,	"	"	180.00
L. D. Geary,	"	"	180.00
Charles Hescher,	"	"	180.00
William F. Krause,	"	"	180.00
Bert H. Moak,	"	"	180.00
William J. O'Haire,	"	"	180.00
David Sheehan,	"	"	180.00
Charles H. Wright,	"	"	180.00
Charles F. Bremnan,	"	"	178.50
Charles H. Cartwright,	"	"	170.00
David J. Hale,	District Physician		2,400.00
PEDRO MIGUEL			
David B. Brown,	Superintendent		3,600.00
Daniel O'Rourke,	Assistant Superintendent		3,000.00
John P. Kyte,	Assistant Superintendent		2,700.00
James B. Jeffries,	Supervisor		2,100.00
Albert V. Waters,	Steam-shovel Engineer	pm	220.50

Name	*Official Title*		*Salary*
James R. Cook,	Steam-shovel Engineer	pm	$210.00
James E. Dodds,	" " "	"	210.00
Harry R. Pease,	" " "	"	210.00
Harry P. Shepard,	" " "	"	210.00
Louis Talbot,	" " "	"	210.00
Claude K. Tireman,	" " "	"	210.00
William Watkins,	" " "	"	210.00
Hobart E. Perry,	Locomotive Engineer	"	210.00
Mark White,	" "	"	199.50
Samuel W. Jennings,	" "	"	190.00
Ben F. Light,	" "	"	190.00
James Blaisdale,	" "	"	180.00
Thomas Ellsworth,	" "	"	180.00
Edward Lamb,	" "	"	180.00
Charles R. Lingo,	" "	"	180.00
Charles A. Pendry,	" "	"	180.00
William T. Piper,	" "	"	180.00
Ernest Scholz,	" "	"	180.00
H. W. Schick,	" "	"	180.00
Joseph J. Nolan,	Steam-shovel Crane-man	"	194.25
William I. Barnes,	Steam-shovel Crane-man	"	185.00
Geo. C. Brown,	Steam-shovel Crane-man	"	185.00
James Doyle,	Steam-shovel Crane-man	"	185.00
Paul M. Harburgh,	Steam-shovel Crane-man	"	185.00
Forrest J. Myers,	Steam-shovel Crane-man	"	185.00
Frank R. Roberts,	Yardmaster	"	199.50
Charles D. Hammer,	Conductor	"	170.00
Arch McCullough,	"	"	170.00
John F. Morley,	"	"	170.00
Rollin T. Brown,	Physician		3,000.00
RIO GRANDE			
Henry C. Hanson,	Supervisor		2,100.00

Name	*Official Title*		*Salary*
TABERNILLA			
Geo. A. Greenslade,	Superintendent		$3,600.00
Harry J. Emerson,	Assistant Superintendent		2,400.00
John T. Loulan,	Foreman		2,100.00
Frank Kelly,	Steam-shovel Engineer	pm	210.00
Fred C. Ganard,	Locomotive Engineer	"	190.00
Sidney Church,	" "	"	180.00
Walker E. Crouch,	" "	"	180.00
David E. Fulton,	" "	"	180.00
Morton E. Greenman,	" "	"	180.00
Holly Hill,	" "	"	180.00
Harry F. Page,	" "	"	180.00
William S. Smallwood,	" "	"	180.00
Fred C. Smith,	" "	"	180.00
William E. Smith,	" "	"	180.00
Frank J. Soder,	" "	"	180.00
Henry C. Swain,	" "	"	180.00
Fred M. Westcott,	" "	"	180.00
Claude C. Fagan,	Steam-shovel Craneman	"	194.25
Benjamin F. Metcalf,	Yardmaster	"	190.00
Willard Rice,	"	"	190.00
John Graham,	"	"	180.00
Mathew Monaghan,	Conductor	"	170.00
TABOGA			
James P. Randall,	Surgeon		3,000.00

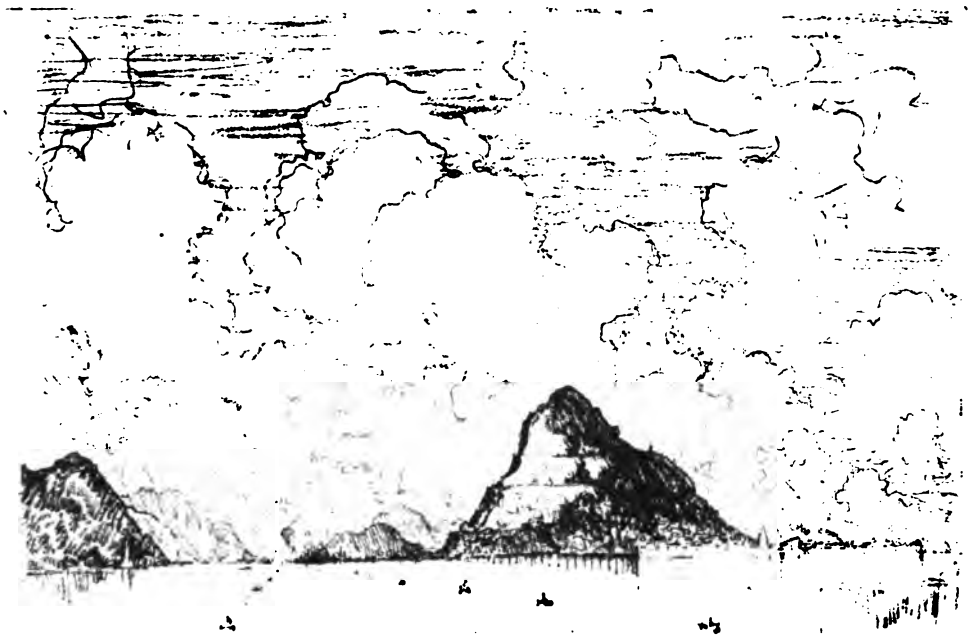
APPENDIX E

PRESIDENT ROOSEVELT'S ENDORSEMENT OF THE RAILROAD MEN

President Roosevelt's endorsement of the Canal organization, on the occasion of his visit to Panama in November, 1906, is found in the following address delivered to the men of the railroad régime at Colon:

"It was without precedent for a President to leave the United States, but this work is without precedent. You are doing the biggest thing of the kind that has ever been done, and I wanted to see how you are doing it. I am profoundly thankful that I shall be able to take back to the United States the message that the nation's picked sons are carrying themselves so well here that I can absolutely guarantee the success of the mighty work which they are doing. It is not an easy work. Mighty few things that are worth doing are easy. Sometimes it is rough on the men and just a little rougher on the women. It has pleased me particularly to see, as I have met the wives who have come down here with their husbands, the way in which they have turned in to make the best of everything and to help the men do their work well.

"I want to say this word to you, men,—right through,—to all of you who are engaged in the work of digging this Canal, whether you are here as superintendent, foreman,



© J. Pennell 1912

Mouth of Canal from Pacific

chief clerk, machinist, conductor, engineer, steam-shovel man (and he is the American who is setting the mark for the rest of you to live up to, by the way), whoever you are, if you are doing your duty, you are putting your country under an obligation to you just as a soldier who does his work well in a great war puts the country under an obligation to him. As I have seen you at work, seen what you have done and are doing, noted the spirit with which you are approaching the task yet to be done, I have felt just exactly as I should feel if I saw the picked men of my country engaged in some great war. I am weighing my words when I say that you, here, who do your work well in bringing to completion this great enterprise, will stand exactly as the soldiers of a few, and only a few, of the most famous armies of all the nations stand in history. This is one of the great works of the world; it is a greater work than you, yourselves, at the moment realize. Some of you, a good many of you, are sons of men who fought in the Civil War. When your fathers were in the fighting, they thought a good deal of the fact that the blanket was too heavy by noon and not quite heavy enough by night; that the pork was not as good as it might be; and the hardtack was sometimes insufficient in amount; and they were not always satisfied with the way in which the regiments were led. Those were the things they talked about a good deal of the time. But when the war was done—when they came home, when they looked at what had been accomplished—all those things sank into insignificance, and the great fact remained that they had played their part like men among men; that they had borne themselves so that when people asked what they had done of worth in those great years all that they had to say was that they had served decently

and faithfully in the great armies. So you men here, in the future, each man of you, will have the right to feel, if he has done his duty and a little more than his duty right up to the handle in the work here on the Isthmus, that he has made his country his debtor; that he has done more than his full share in adding renown to the nation under whose flag this canal is being built.

[A voice in the audience: "How about Mr. Bigelow?"]

"Why, gentlemen, there never was a great feat done yet that there were not some men evil enough, small enough, or foolish enough, to wish to try to interfere with it and to sneer at those who are actually doing the work. From time to time little men will come along to find fault with what you have done; to say that something could have been done better; that there has been some mistake, some shortcoming; that things are not really managed in the best of all possible manners, in the best of all possible worlds. They will have their say, and they will go downstream like bubbles; they will vanish; but the work you have done will remain for the ages. It is the man who does the job who counts, not the little scolding critic who thinks how it ought to have been done.

"I go back a better American, a prouder American, because of what I have seen the pick of American manhood doing here on the Isthmus. You will have hard times. Each of you will sometimes think that he is misunderstood by someone above him. That is a common experience of all of us, gentlemen. Now and then you will feel as if the people at home were indifferent and did not realize what you were doing. Do not make a mistake; they do realize it, and they will realize it more and more clearly as the years go by. I cannot overstate the intensity of the feeling I have (and therein I merely

typify the sentiment of the average man of our country) as to the vital importance of the task that you are doing; and to each of you who does his share of that task there will come in the end the proud assurance of vital duty well done. This assurance can come to but a limited number of men in each generation; and you are to be congratulated that you are to be among that limited number. I do not pity you because you have before you a hard task. I would feel ashamed of you if I thought you wanted pity. I admire you. I wish that any one of my boys was old enough to take part in the work. I feel that to each of you has come an opportunity such as is vouchsafed to but few in each generation. I shall see if it is not possible to provide for some little memorial, some mark, some badge, which will always distinguish the man who for a certain space of time has done his work well on the Isthmus, just as the button of the Grand Army distinguishes the man who did his work well in the Civil War. Another thing: In the Grand Army the spirit that appeals to me most is the spirit of full and frank comradeship among its members. Whether a man was a lieutenant-general of the army of the United States, or whether he was the youngest recruit whose age would permit him to serve in the ranks, makes no difference; if he did his duty well he is a comrade to his fellows, and acclaimed as such in a spirit of full equality in every Grand Army post. The point is not the position, but the way in which the man handled himself in the position. So here, whatever the work, whether it be that of chief engineer, assistant engineer, machinist, foreman, or steam-shovel man, the only question that need be asked is: Did the man do it well? And to do it well, gentlemen, you must do just a little more than merely earn the salary.

Each man must have in him the feeling that, besides getting what he is rightfully entitled to for his work, that aside and above that must come the feeling of triumph at being associated with the work itself, must come the appreciation of what a tremendous work it is, of what a splendid opportunity is offered to any man who takes part in it. As I came up the line through the Culebra Cut yesterday, on one of the steam-shovels they had cut the legend, 'We will do our best to help you dig it.' I liked to look at that motto. That is the right spirit. Another man called out to me as the train passed, 'We are going to put it through.' That is the spirit I like to see, and it is the spirit that you have in you.

"In any army, there are some men who, to use a homely phrase, can't stand the pace. So, here on the Isthmus, there is an occasional man who means well, but who does not know how; there is an occasional man who does not mean well at all; and when a man of either type gets out and goes home it is much more comfortable for him not to say that he failed, but that somebody else was not really a good man. There will always be a certain percentage of men in any work who for one cause or another become disgruntled, become sulky, and then try to run down the work and run down those who are doing it; and they are the natural and legitimate sources of the misinformation and slander of the yellow writers, of the men who preach the gospel of despair, whether in magazine or in newspaper. If there is any veteran of the Civil War here, he will tell you there were 'coffee coolers' in those days too; there are some of them to be found everywhere and at all times. These men, as they go home beaten, will give a totally wrong impression of the rest of the men down here, a totally wrong impres-

sion, not to their countrymen as a whole, but to a few people of little faith who measure the standard of you who succeed in doing the work by the standard of those who fail in the effort to do the work. We can disregard them. No man can see, as I have seen, the character of the men engaged in doing this work and not glow with pride to think that they are representatives of his country. No man can see them and fail to realize that our honor and interest are safe in their hands—are safe in your hands.

"In closing, all I have to say is this: You are doing a work the like of which has not before been seen in the ages, a work that shall last through the ages to come, and I pledge you as President of the United States, and speaking for the people of the United States, every ounce of support and help and assistance that it is in my power to give you, so that we together, you backed by the people of the United States, may speedily bring this greatest of works to a triumphant conclusion."

APPENDIX F

"A TRIUMPH FOR THE ENGINEERING PROFESSION"

In its issue of May 28, 1914, the *Engineering News* of New York, the leading organ of the profession in the United States, published an editorial article under the heading, "The Cost of the Panama Canal as Estimated and as Built: a Triumph for the Engineering Profession," an amplified digest of which follows:

There is no task laid upon the engineer which involves greater responsibilities and greater difficulties than the making of preliminary estimates of cost. Estimates of the unit prices for the Canal work were made under the railroad régime in 1905, at a time when the conservation of the health of the employees, their housing, and the source of labor supply were unsolved problems. The accuracy of these estimates is one of the most notable achievements of modern engineering. They involved special difficulties. The work was of a magnitude wholly unprecedented. It had to be carried on at a distance of two thousand miles from the base of supplies. The influence of tropical conditions, of Governmental control, of uncertain labor markets, all had to be taken into consideration with a view to their possible influence upon the cost. The work had to continue over a term of years, during which great changes in market prices of labor and of construction materials were probable.

Bearing all these things in mind, a comparison between the estimates of cost per unit of work made by the eminent engineers appointed by the international advisory board of 1905—William Barclay Parsons, Isham Randolph, and J. W. Welcker of Holland—and the actual expenditures upon the Canal is of the greatest interest to members of the profession, particularly as it is found with regard to the largest items that the final cost is amazingly close to those original estimates.

The estimate made by Messrs. Parsons, Randolph, and Welcker, after consulting with Chief Engineer Stevens, was: Culebra Cut, all materials without classification (over 10 feet above sea level), 80 cents per cubic yard. The committee in several instances fixed upon the same figure as the commission of 1899 for the cost of the work. While the unit costs of the 1899 commission are of interest, and agree closely with those of 1905, still they were made as a basis of comparison for the several proposed Canal routes, and are applied alike to all conditions rather than to the special conditions of the Panama Canal. Therefore, reference is here made to the 1905 board of experts that dealt with the Panama problem alone. The largest single item in the cost of the Canal has been the digging of the Culebra Cut, involving in round figures about 110,000,000 cubic yards of excavation.

Turning to the Government records, the official statement shows that up to December 31, 1913, the total cost of all dry excavation in the section from Gatun to Pedro Miguel, which includes the Culebra Cut, was slightly under $86,000,000, and that the average cost was 78.18 cents per cubic yard. In other words, the engineering estimates made ten years ago of the cost per

cubic yard of excavating Culebra Cut, the largest item in the Canal work, varied by only some two per cent. from the actual cost of the work.

At this time Mr. Stevens informed the committee that not more than 100 steam-shovels would be required for the excavation of the Canal. During the construction of the big ditch 102 steam-shovels were used.

Mr. Stevens further estimated that of the 100 shovels on the Isthmus, 80 would be the average number continuously in commission, and that the output per day ought nevertheless to be 1000 cubic yards per shovel for the 100 shovels, which would mean 1250 cubic yards per shovel with 20 out of commission. From 1907 to 1913 the output per shovel in the central division of the Canal was 1188 cubic yards per shovel.

The next largest item to excavation in the cost of the Panama Canal is the concrete in the locks. The estimate for concrete in place made by the engineer committee of 1905 was $8.00 per cubic yard. The Gatun locks contain over 2,000,000 cubic yards of concrete, costing over $15,000,000, and their cost per cubic yard was $7.4641. In the locks at Pedro Miguel a considerably better cost record was made, the cost per cubic yard for something over 900,000 yards of concrete being $5.8897. In the Miraflores locks, which contain about 1,500,000 cubic yards of concrete, a still better record was made, the unit cost being reduced to $5.3665. The engineers on the Isthmus have classified separately the concrete which was laid in connection with the machinery of the locks. This concrete has cost about $12 per cubic yard and as the total expenditure on such concrete in all the locks is three quarters of a million dollars, it would tend to increase somewhat the unit price of

the other concrete if all the concrete were classed together.

These figures do not, however, convey a correct idea of the relative economy in the execution of the work on the different locks; not only were weather conditions vastly in favor of the Pacific locks, for which sand was brought from Chame for very much less than from Nombre de Dios, whence that for the Atlantic locks came, but the rock for the Pacific locks required only a short rail haul for which no special plant was needed or provided, whereas for the Atlantic locks a twenty-mile rough ocean tow was essential, and the cost of the work as given was largely absorbed in this plant.

The original estimates have come astonishingly close to the cost of the finished concrete in the locks. At the time of making the price of $8 for the very large amount of concrete in the Canal structure, it was not definitely known where the sand and broken stone could be obtained. Mr. Stevens stated to the committee that it might be necessary to sort rock from the Culebra Cut for the stone aggregate and also to crush some of this rock for sand, but neither of these expedients was resorted to. Had Mr. Stevens then had the definite knowledge of the source of supply, which he had later, these prices would probably have been made slightly lower, but accepting conditions as he saw them the estimated unit price is more than justified.

Realizing that if there was to be a canal at Panama it would have to be of the lock type and would require very large quantities of concrete, composed of broken stone, sand, and cement, Mr. Stevens took steps to locate and obtain control of these necessary materials. In the plans of the French Company for a sea-level canal

these materials would have been needed in but minor quantities. During the operation of the French Company and during the first year of American work the sand had been obtained by dredging from the Chagres River, near Gamboa, and by rail transportation to the site of use. It was known that this source of supply was inadequate and that the vast quantities needed could not be supplied in this manner. Therefore, other available sources were looked for. John Popham, formerly American Consul under President Cleveland, called attention to, and furnished the chief engineer samples of, sand from Nombre de Dios on the Atlantic and Chame on the Pacific. These were carried by the late Alfred Noble, one of our foremost American consulting engineers, to New York, and tested. He reported that these sands were suitable in every respect for the proposed works, the test he caused to be made showing them to be equal, if not superior, to those then being used by the Pennsylvania Railroad Company in the construction of its terminal station in New York City. Preliminary steps were at once taken with the Panama Government looking to acquiring the rights to take sand from these locations, and it has resulted in the use of 785,893 cubic yards from Nombre de Dios, and 1,741,196 cubic yards from Chame up to June 30, 1913, these being the only sources of supply used for such work during the Canal construction.

Although 60 per cent. of the Culebra Cut is what can be, and is, rightly termed rock, but little of it is suitable for concrete work. The locks and dams required four million cubic yards of the very best crushed stone. After the appointment of Mr. Shonts one of the first duties placed on the engineers was the locating of suitable stone for this work. There were at this time two

small crusher plants in operation, both engaged in breaking stone for the Panama street improvements, one located at Ancon Hill, for which stone was being quarried from the Hill; the other located at Pedro Miguel, crushing such suitable rock as the Culebra Cut would furnish. This was not sufficient to meet the demands for paving in Panama. Surveys and examinations resulted in locating an abundant and excellent supply at Rio Grande on the summit of the Panama Railroad grade, with a down-grade haul to the Gatun and Pacific locks,—having the first fundamental requirement made by the chief engineer, that all possible material must move down grade. To furnish material for the concrete work in hand,—for the lock work had not been started,—a small plant was erected at Rio Grande. This consisted of two French jaw-crushers of the Blake type, and was supplemented by two rotary American crushers; and, up to February, 1910, it furnished 235,389 cubic yards of crushed rock. The exploration was continued for other possible sites, it being realized that with the Culebra Cut moving its material north through Bas Obispo toward the larger dumping grounds and to Gatun dam, together with the commercial and other requirements on the Panama Railroad, the addition of thousands of tons of broken stone to its traffic would place an excessive burden on railroad operations, if it all had to come from Rio Grande.

F. B. Maltby, Division Engineer of the Atlantic division of the road, now located and called attention to Puerto Bello rock as a source of supply. This, while requiring a sea voyage of about twenty miles, made possible an all-water haul to Gatun, and thus relieved the railroad of that burden. This quarry was acquired,

and from it 1,921,929 cubic yards of broken rock had been used in Canal construction up to June 30, 1913. For the building of the Pedro Miguel and Miraflores locks, for these were contemplated at the time, a quarry east of the railroad at Rio Grande had been selected as not only being capable of furnishing an abundant supply, but involving only a short haul and that on a down grade to these locks. In building these locks, however, the old quarry on Ancon Hill, primarily used for road work in Panama, has been utilized with a haul about three times as long and on an up grade. This is the only known instance where Chief Engineer Stevens' fiat for down-grade movement has not been observed. The Ancon Hill quarry had furnished 2,558,578 cubic yards to June 30, 1913.

Another very large item in the cost of the Canal work was dredging, especially in the harbors at the Pacific and Atlantic entrances. The committee of unit prices of 1905 made a price of 15 cents per cubic yard for the mud and sand in Colon and Panama harbors, but estimated 25 cents per cubic yard for "soft material removed by hydraulic pumps in canal." Turning to the records of actual cost we find that all the dredging done from Gatun locks to the sea, including that through the Mindi swamp as well as in the shallow water of Limon Bay, has amounted to about 38,500,000 cubic yards and the unit cost has been 23¼ cents per cubic yard. On the Pacific end about 40,000,000 cubic yards of material have been excavated by dredging between Pedro Miguel and the sea, most of which has been excavated in the sea-level section from Miraflores locks to Balboa. The average cost of all this work has been 25.52 cents and the average cost of all the Canal dredging for 78,500,000 cubic yards was 22.23 cents per cubic yard.

Yet another very large item in the cost of the Panama Canal work is the dam at Gatun, in which over 12,000,000 cubic yards of dry filling were dumped from cars, and nearly 11,000,000 yards were placed by hydraulic filling. The committee of 1905 estimated for dams as follows: "Earth borrowed, 50 cents per cubic yard; extra price for placing in dams from line of Canal within a distance of four miles, 20 cents per cubic yard. When placed in dam by pumps from barges below elevation +50, 20 cents per cubic yard; above elevation +50, 30 cents per cubic yard." In actual construction the dry filling has cost less and the hydraulic fill a little more than these estimates. The average cost per cubic yard for the 12,000,000 yards of dry filling has been 43.55 cents and for the hydraulic filling 29.85 cents.

Another large item in the cost of the work was the excavation at the lock sites. The committee of 1905 estimated $1.15 for hard rock excavated in the dry elsewhere than in the Culebra Cut, and in the lock sites below elevation +10 the estimate was $1.50 per cubic yard. In actual experience on the Gatun locks over 4,600,000 cubic yards were excavated in the dry, nearly all of which was in rock that would be classified as hard rock and the average cost was only 67.71 cents. Dredging excavation was also done in the Gatun locks amounting to nearly 1,800,000 cubic yards, at an average cost of 32 cents per cubic yard. There are also items for preparing foundations by excavation and dredging amounting to nearly 250,000 cubic yards, the average cost of which was $2 per cubic yard. This latter item doubtless includes some of the material for which a higher price was allowed, as noted above, by the commission of 1905. On the locks at Pedro Miguel the dry excavation cost 91.2 cents per

cubic yard. The item "preparing foundations," involving 176,000 cubic yards of excavation, cost $2.72 per cubic yard. At the Miraflores locks, dry excavation in the lock site amounted to 93 cents per cubic yard; dredging excavation 46 cents, while 416,000 yards were excavated under the head "preparing foundations" at a cost of $1.90 per yard. The general comparison, therefore, shows that the engineers in charge of the work on the Isthmus succeeded in excavating the rock at the lock sites for a considerably lower figure than was allowed.

There is another estimate which was made by the minority members of the International Commission of 1905, and which it is of great interest to compare at this time with the final result. That is the estimate of the time required for completion of the lock canal. The minority members, Alfred Noble, Isham Randolph, F. P. Stearns, Gen. H. L. Abbot, and H. L. Ripley, estimated at the beginning of 1906 that the lock canal which they recommended could be completed in eight and a half years. Their opinion was that the controlling factors in the time of completion would be the Culebra Cut and the Gatun locks, and their opinion was that the excavation of the Cut could be completed in a somewhat shorter time than the lock construction, but that the whole work could be completed and opened for traffic in eight and a half years. This report of the board was dated on Jan. 10, 1906, and the period of eight and a half years from *that time would mark the middle of 1914 as the time for the completion of the Canal.*

The first trade ship to pass through the Panama Canal was the *Pleiades*, on August 16, 1914.

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